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THE SPECIAL FIELD OF NEUROLOGICAL SURGERY.[1]

BY HARVEY CUSHING, M. D.,

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Gentlemen:—In response to the friendly request of Dr. Crile, your presiding officer, I shall attempt to formulate some personal views concerning a branch of surgery, which, in this country at least, largely owing to the allurement of other and more immediately promising fields of operative endeavor, has hardly received the attention it deserves.

Through the generosity of Dr. Halsted, his junior associates have been given, in a measure, the privilege of directing the work in some of the subdivisions of his large surgical clinic, in order that they may concentrate their efforts toward advancement along particular lines. It has thus fallen to my lot, temporarily and under his guidance, to control the group of cases which present features chiefly of neurological interest; and it is upon the present possibilities and limitations, as well as upon the future outlook for this department of surgery, that I shall briefly dwell tonight.

To many of us as students, neurology was the *pons asinorum* of the medical curriculum. Nor can I recall any very earnest efforts to cross the bridge, particularly by those of us whose ability to visualize lesions, that probably had never been seen under the microscope nor handled in the gross, was—to say the least—not abnormally developed; and who, for the stimulation of their interest, needed certainties of diagnosis and assurances of therapeutic results. Even for a student, whose inclinations from the beginning may tend in this direction, a steady prosecution of the subject is beset with great discouragements. Special training is necessary before one can obtain a working knowledge of the underlying pathological processes, without which the clinical superstructure is built upon sand. The morbid anatomy of the lesions is greatly obscured by the imperfections of our methods of examination, but still more because they are but rarely seen except at the autopsy table and then only in their terminal stages. Furthermore, owing to the technical difficulties of our present laboratory methods, so long a time often elapses before the histological alterations in the tissues are demonstrable, that, in the interim, our recollection of the clinical picture has become dimmed and interest has fled elsewhere. That the morbid physiology of the subject—its experimental side—when compared with the researches that have been made in other directions, has hardly been touched, may be a matter of

[1] An Address delivered before the Academy of Medicine of Cleveland, November 18, 1904. Reprinted from the *Cleveland Medical Journal*, January, 1905.

regret, but can hardly surprise us when we consider that the normal structure and function of many parts of the nervous system remain as yet unknown. Finally, the privilege of regarding as historic the days when there existed "a plague of drugs . . . . least mischievous when merely superfluous," and which a century ago evoked the well-known aphorism of Benjamin Franklin—"He is the best physician who knows the worthlessness of the most medicines"—carries with it a satisfaction that is not without alloy. For what eager student of medicine can face without dismay the "poverty of therapy" that characterizes the present day, and which is emphasized more especially in the neurological clinic, which stands largely on the therapeutic tripod of iodine, bromine and electricity.

Will a more general application of surgical methods offer anything for this department in the way of diminishing the present number of the medicinally incurable, or of improving the condition of those whose maladies time alone, not medicine, restores to a certain degree? Certainly not, while the neurologist and surgeon maintain the same distant relations that have heretofore existed between them. Aware, so far as one who does not operate can be, of the possibilities of surgical therapy in a given condition, the neurologist spends days or weeks in working out the presumable location and nature of, let us say, a cerebral tumor. An operator is called in; he has little knowledge of maladies of this nature and less interest in them, but is willing to undertake the exploration. The supposed site of the growth is marked out for him on the scalp by the neurologist; and he proceeds to trephine. The dura is opened hesitatingly; the cortex is exposed, and too often no tumor is found. The operator's interest ceases with the exploration, and for the patient the common sequel is a hernia, a fungus cerebri, meningitis and death. But should this be a matter for surprise? Does the internist deem it his duty to instruct an operator in the mysteries of an abdominal tumor and show him where and how to make his exploration? Does he not demand that the surgeon should be as familiar with the symptomatology and the underlying morbid factors of the disease as he is himself? Certainly the relationship between the internist and the general surgeon is far closer than it was in the days of the professional herniotomist, whose instruments were looked over and who was directed in the course of his operation by the physician.

I take it that we all are, or should be, branches grown from the common stem of Medicine—in the broad Hippocratic meaning of the term—and nourished through the roots of General Pathology. And whether one chooses to follow lines of surgical therapy in his own subject, and another not, is purely a matter of personal inclination and manual training. Nor is it less true, I think, of any individual branch of this parent stem than of the tree itself, that, without flourishing surgical twigs, it will, like Dean Swift's noble elm, die at the top.[2]

But why this long preamble? Because it seems clear that in order to advance surgical measures, whether they are to deal with diseases of the nervous system, the deformities of children, the maladies peculiar to women, genito-urinary diseases, or those belonging to any other more or less limited branch, specialization, or better, concentration of thoughts and energies along given lines is necessary. Why are we so slow to understand that we cannot graft an independent twig of operative surgery on any of the branches of this huge medical tree and have it grow undeformed? Original growth from the main stem of general medicine and surgery is necessary, but some at least of those whose inclinations follow the branch of neurology, must do their own surgery, if it is to aid in the development of their therapy, and not depend on the help supplied by the lukewarm assistance of other departments.

To successfully cope with the many operative problems offered by the various disorders of the nervous system, a man, after a thorough training in pathology and medicine (in its broadest sense) must study, not only in the neurological clinic but also in the laboratory, the pathology of these afflictions in their histological and—what is still more important—in their experimental aspects. Any one who like myself has passed from general surgery into this special branch without this preliminary training, finds himself but ill prepared for his new work and must be satisfied to merely follow the lead of others, as I have largely had to do.

Though a surgeon possesses a natural tendency towards handicraft in matters therapeutic, I do not wish to be considered as one who distorts neurological problems by viewing them with an operative strabismus uncorrected by the proper spectacles. I wish merely, so far as my time allows, to point out some of the present possibilities of affording surgical relief in certain maladies for which the outlook is otherwise most forlorn, and at the same time to lay stress on certain points that give us hope for the future. I shall keep away, so far as possible, from beaten paths; for that a cerebral abscess should be evacuated, a ruptured meningeal vessel tied, the spinal cord relieved from pressure, and a severed nerve sutured, has long needed no comment.

The Brain and its Envelopes.

At the outset something may be said relative to the surgery of cerebral tumors. A very natural reaction followed after it became generally known how unsatisfactory had been the results in the early series of cases, so enthusiastically undertaken when for the first time aseptic processes had permitted surgeons to perform craniotomies with a certain assurance—so

[2] "The chief lesson of the Hippocratic period for us is that, in practice as in honor, medicine and surgery were then one; the Greek physician had no more scruple in using his hands in the service of his brains than had Phidias or Archimedes; and it was by this co-operation in the fifth century that the advance was achieved which in our eyes is marvellous. As we pursue the history of medicine in later times we shall see the error, the blindness, and the vanity of physicians who neglected and despised a noble handicraft. The clear eyes of the ancient Greeks perceived that an art is not liberal or illiberal by its manipulations, but by its ends."—Clifford Allbutt. An Address on the Historical Relations between Surgery and Medicine. The Congress of Arts and Sciences, St. Louis, Sept. 27, 1904.

far as wound healing was concerned—of operative safety. In 1891, Agnew concluded an admirable paper on the subject with the words, "it is more than probable that, as our observations multiply, the sphere of the trephine, as a preliminary measure for the removal of brain tumors, will be lessened rather than amplified." And this from the city which, perhaps above all others, has since contributed the greatest number of successful cases! Von Bergmann's discouraging views are too well known to repeat here, and I doubt not that his opinion has done more than any other single factor to keep the surgery of this particular group of cases at a standstill: just as the views of the physiologist Flourens—that all parts of the cortex have precisely the same signification—so long retarded the studies of cerebral localization. Happily for us things are far different today. Not only has the localization of the more approachable parts of the cortex—after a long series of researches culminating in Flechsig's anatomical observations[3] and in the experimental researches of Sherrington and his co-workers,[4]—been put on a working basis for us, but also through the enormous strides in operative technique, particularly through Wagner's osteoplastic method of resection, we are now able to bring under observation extensive portions of the cerebral surface. In the earlier days of cranial surgery, it must be remembered, lesions in the motor area of the cortex were about the only ones that were considered approachable, and when we realize how far afield the experimentalists had gone in delimiting the "motor cortex" and, guided solely by calculations of the Rolandic area made upon the scalp, through what small trephine openings operators attempted to disclose underlying growths, it is little wonder that failures were almost universal. Today the reports of successful extirpations[5] are becoming more and more frequent.

Happily also a perfect functional restoration has taken place in many cases, for we now know that a considerable percentage of the growths originate in the meninges and, being by nature non-infiltrating, damage the cerebrum by a compressive invasion alone.

It is, however, upon another and less thoroughly ventilated aspect of the subject that I wish to dwell, namely upon the performance of palliative operations both for the supposedly inaccessible growths as well as for those which in the light of our present knowledge still remain non-localizable. In affording a measure of relief to these distressing cases, one may fulfill the chief of his duties as a physician—to prolong life and at the same time alleviate suffering. For the mere lengthening of a patient's months or years without rendering them more livable, is, as Dr. Fitz has so emphatically pointed out, no justification whatsoever of an operative procedure.[6]

The triad of symptoms, the profound headache, the vomiting, and sooner or later the stasis papillæ with ensuing loss of vision, are due to the increased tension and consequent disturbance of circulation within the closed box of the skull. Whatever and wherever be the lesion itself—whether there be a simple growth located in a hemisphere, another which obstructs in some way the outflow of cerebro-spinal fluid, a ventricular dilatation from inflammatory causes, or circulatory disturbances from a longitudinal sinus thrombosis—in all cases the tension phenomena are the same, varying only in degree and in their time of onset. The symptoms of a localizing nature whether motor, sensory, visual, psychic,[7] or what not, that may be superimposed on this triad, bear no necessary relation to the headache, vomiting and ocular symptoms, which, if unrelieved, cause perpetual suffering, lead to blindness, and finally are responsible for death itself, except in those rare instances of direct implication of some vital center in a spreading lesion. Complete relief to these symptoms may be brought about, and brought about promptly, in the vast majority of cases by the "decompression" of a palliative craniectomy as many neurologists[8] and surgeons have emphasized, and patients may go on for months or possibly years, free from pain, and best of all, with their eyesight preserved.

I have at the present time several of these cases under observation, patients who before the operation were bed-ridden and suffering invalids. Two of them have been able to return to their occupations; some others, sad to relate, though comfortable, are practically blind owing to the long postponement of the decompression. And it is for the preservation of vision, particularly in these cases in which the intellectual faculties are in no way disturbed, that the operation should be resorted

[3] Paul Flechsig, "Einige Bemerkungen über die Untersuchungsmethoden der Grosshirnrinde, insbesondere des Menschen." Berichten der mathematisch-physischen Klasse der Königl. Sächs. Gesellschaft der Wissenschaften zu Leipzig. Sitzung vom 11 Jan., 1904.

[4] Grünbaum and Sherrington. The Cerebral Cortex of the Higher Apes. Proceedings of the Royal Soc., 1901.

[5] Even of growths from situations, which a few years ago were considered inaccessible; such as the "lateral-recess," tumors (cerebello-pontine), of which Sir Victor Horsley has had a considerable series. It is not impossible that a diseased pituitary body may some day be successfully attacked.

[6] R. H. Fitz. Some Surgical Tendencies from a Medical Point of View. Boston Medical and Surgical Journal, Vol. 145, Dec. 19, 1901.

"Any operation which does not better the condition of the patient must be regarded as a therapeutic error, since the knowledge thus obtained shows that the operation should not have been performed."

[7] The cases with superimposed psychic symptoms, indicating as they do lesions of the frontal lobes, frequently end their days in asylums for the insane. The recent report by Blackburn ("Intracranial Tumors among the Insane," 1903, Gov. Printing Office, Washington) from the Government Hospital for the Insane, records the discovery, in their series of autopsies, of 28 true tumors, of which 17 were of the so-called "endothelial sarcoma" variety; that is, they were comparatively benign growths, originating from the meninges and many of them distinctly operable.

[8] Thus Alfred Sänger of Hamburg, in a paper (Ueber die Palliativ-operation des Schädels bei inoperablen Hirntumoren) read before the German Surgical Congress, says: "In short, palliative trepanation in case of cerebral tumor is an operation which even if not absolutely free from danger, is of extraordinary blessedness, and, in the hands of a practiced surgeon, one that I would like to recommend in every case, in consideration of the impotency of internal medicine and in view of the distressful (qualvollen) suffering, and above all of the menacing blindness."

to promptly, that is, as early as possible after the diagnosis of probable brain tumor has been made.

The dread of the operating room, which many doctors share with their patients, together with the supposed uncertainties of an exploration, has led and still leads to one invariable course of treatment, large doses of the iodides being given with the vague hope that lues venerea may be at the bottom of the trouble. But even should there be definite grounds for this suspicion, the indications for an operation in many cases are none the less clear. In the first place, many, perhaps the largest proportion, of the gummata are superficial, accessible, and when exposed easily enucleated: they are, furthermore, very resistant to the usual antisyphilitic therapy, and, during the necessarily long term of treatment, the experience of watching a choked disc going on to a more or less complete optic atrophy, or of seeing other troubles supervene, is by no means uncommon. Some time ago I had under my care a patient, known to have had syphilis, and who presented symptoms of a cerebral growth, presumably an approachable one, since irritative motor phenomena of a Jacksonian character were superimposed. It was deemed advisable, on consultation, to prolong still further the use of mercury and potassium iodide, though these drugs had already been given a fair trial, with only a modicum of relief. The woman died suddenly one night in status epilepticus and at the autopsy a cortical gumma was found in the situation expected. Such experiences should teach us that, unless the intracranial symptoms, in cases of this sort, subside very rapidly under the treatment, a more prolonged trial of these drugs had better be reserved for the post-operative period. Moreover it must not be forgotten that symptoms occasioned by non-luetic processes, often for a time show a marked amelioration under these every-day measures, so that, unless we are on our guard, we may easily be led astray in our conclusions based upon these so-called therapeutic aids to diagnosis.

A palliative trepanation, although in itself not a very difficult operation, demands not a little forethought as well as manipulative skill. When there is no expectation of finding a growth and when the operation is to be carried out for decompressive purposes only, the site must be carefully chosen, for the hernia which necessarily results, and which is meant to act as a "safety valve" for the compressed brain, strangulates practically all function out of that portion of the cerebrum which protrudes. For this reason we must be careful lest, in relieving the patient of his pain, we substitute some serious form of paralysis. A more or less silent field of the cortex, therefore, should be selected. A relatively wide area of bone must be removed, its extent depending upon the degree of tension found at operation. The dura should be left open, after being slit up in a stellate fashion to the edge of the wound, or better still cut away entirely; otherwise there may be local pain resulting from pressure by the hernia which may crowd this sensitive membrane against the edge of the bone. Even to the painstaking final approximation of the scalp wound, every detail of the operation and of the local after-treatment must be followed out with the greatest care, if one wishes to avoid that most distressing of all complications, a fungus cerebri, which I am happy to say has occurred to me only twice in a long series of operations. In some cases of "silent" basilar tumors leading to an obstruction of the ventricular outflow the herniæ have rapidly grown to be almost as large as the patient's head without any parting of the scar.*

The particular form of decompressive operation which has proved most serviceable in the majority of the recent cases of non-localizable growths, is an inter-muscular one, sometimes conducted bilaterally, through the temporal region, with the removal of the squamous portion of the os temporale and closure of the muscle and its fascia over the denuded brain. But of the details of this procedure, more will be said in another paper.

I shall now pass on to the consideration of another large group of cases, those in which the symptoms are due to intracranial hemorrhage. Certain of these, more particularly the extradural forms of circumscribed effusion, which are usually due to the laceration of a branch of the meningeal artery, have long been recognized as distinctly and urgently operable. Interference with other varieties of hemorrhage is less commonly advocated. Nevertheless, we are coming to feel that the diffuse subdural hemorrhage associated with fracture of the base of the skull, the hemorrhage which occurs in the newborn—both of which usually follow the rupture of veins alone—and also the arterial hemorrhages of the adult into the substance of the brain, in selected cases, are as properly and advisedly attacked surgically as are the more accessible, localizable, and easily treated effusions of the blood.

In the diffuse bleeding from traumatic basal fractures, which in most cases can readily be differentiated from the extradural form by means of a lumbar puncture, there often is urgent need for decompression with the evacuation of clots, and drainage, if there is a continuance of the bleeding. In these cases also, the operation mentioned above has been found to be the most convenient means of approach. Of course it is not always possible to save these patients when the extravasation is large and especially when it is associated with a serious contusion of the brain. Nevertheless, trepanation will go a long way toward warding off the later compression effects produced by traumatic œdema, which, in the light of Cannon's experiments, is doubtless responsible for many of the fatalities.

Some months ago during a race, two young men were thrown from a tandem motor-cycle, and both sustained severe cranial injuries. They were brought to the hospital, unconscious. Bloody fluid was withdrawn from the lumbar subarachnoid space of each patient. One of them, apparently the more severely injured, was trephined low down in the skull, and bloody fluid with clots in considerable amount was evac-

* Many of the technical details, found to be best adapted to my personal needs in performing cranial operations, and in avoiding local post-operative complications, have been described elsewhere. (Pneumatic Tourniquets, etc. The Medical News, March 26, 1904.)

uated; the other was left alone. The former patient was up in 48 hours, after the operation; he was entirely free from symptoms, left the hospital early, and would probably have been well, today, had he not a short time later died the almost inevitable traumatic death of a motor-cycle pace-maker. The other patient remained in the hospital for a month, during which time he complained of headache, dizziness and the usual familiar sequels of these injuries, from which he has never become entirely free.

To cite a second case: A young man was tilted out of the back seat of a wagon by the unexpected starting of the vehicle, and landed upon the back of his head on the hard road. After some hours of unconsciousness he was found to have a homonymous hemianopsia and aphasia. Instead of investigating the cause of these symptoms, presumably due to local hemorrhages in the right occipital lobe, and, by contrecoup, in the left inferior frontal region, his physician, owing to the fact that there was neither a scalp wound nor any external evidence of fracture, and because the patient was making a progressive though slow improvement, decided against operation. Two months later there occurred an epileptic attack with a peculiar uncontrollable motor-speech (jargon) aura. These attacks increased in frequency and severity. Finally, a year later, the lower frontal convolutions were exposed, disclosing an adherent dura and a depressed scar over Broca's convolution. The epileptic attacks have ceased, but the visual defect and aphasia remain as before.

In the following case a different course was followed: A college boy sustained a severe blow on the head during a football scrimmage, and soon became unconscious. There was no indication of any external lesion. Though his symptoms had in large part subsided by the following day, he remained somewhat stuporous, responding slowly and reluctantly to inquiries. The movements of the face, tongue and arm on the right side seemed somewhat less free than those of the corresponding parts on the opposite side, and when roused and questioned, the patient stated that his hand was "numb." Blood-stained fluid was found within the lumbar meninges. Through an intermuscular incision in the left temporal region a subdural clot, about a centimeter thick and covering the lower Rolandic area, was bluntly scraped and irrigated away. The patient came out of the anæsthetic with a perfectly clear and active sensorium, though with no memory of the events subsequent to the injury. His convalescence was rapid and he escaped the usual slow restoration to the normal—perhaps never quite to the normal—of these cases when left alone. Numerous other instances might be enumerated.

For the more severe, the more desperately injured cases, which present bulbar symptoms, owing to an implication of the vaso-motor, vagus and respiratory centers, a prompt craniotomy, perhaps bilateral and into the cerebellar fossa, with evacuation of clots and drainage, offers the only hope of life. In passing, I may remind you that it is clinically well recognized that when these intracranial hemorrhages are complicated by extensive fractures of the cranial vault, the patients more frequently fail to show critical symptoms than do those who have escaped with an intact though fissured skull.

Much more important, it seems to me, are the intracranial hemorrhages which occur at birth. The problem is the same as in the cases just mentioned, there being a free escape of venous blood into the subarachnoid space, but with the additional element in favor of the child that the cranium is in a measure distensible. The conditions, therefore, are comparable to those hinted at above as occurring in the adult, namely a diffuse hemorrhage accompanied by some fragmentation of the vault. But given the distensibility of the cranium, the immediate consequences are not so likely to be serious even with an extensive effusion; and yet the late sequels are lamentable enough. The usual history is sadly familiar to all of us: A first-born child; a prolonged labor, often ending with instrumental delivery; some difficulty experienced in getting the child to breathe satisfactorily; a tense fontanelle; the child too weak to suckle and so fed by a dropper for several days; and after a time an apparent restoration to health. But too often, some months later, it is noticed that the child uses one side of the body, an arm or a leg, badly, or may be mentally deficient or blind. He eventually grows up, often with one or more spastic limbs, but worst of all, not uncommonly, he is subject to cortical fits. In this particular group of epileptics I have had a considerable experience in trephining and when the attacks were of a Jacksonian (motor) character, in extirpating areas of the precentral gyrus. And I can only say that the extraordinary variety of cortical lesions encountered defies description. Why should not these children at the time of the accident have been afforded the same chance of avoiding subsequent complications that is given an adult with intracranial hemorrhage? The reason is not far to seek. The author of one of our best text-books of neurology accredits most of the cases of spastic paraplegia to hemorrhages occurring at birth or in infancy, and while granting that it would be ideal if we could, at the time, treat them surgically, concludes that infants could not possibly survive the ordeal. A leading pædiatrist, also, whose knowledge of the pathology and symptomatology of these conditions is surpassed by none, has stated that these lesions cannot be attacked at the time of their occurrence because the coagulation time of the blood in the new-born is so slow that a fatal hemorrhage would necessarily follow any operation of this severity. This latter view would seem to have resulted from a misconception, unless our observations on coagulation are at fault; and, so far as endurance of the operative procedure is concerned, when one considers what the child's head is fitted by nature to withstand during parturition, the far milder traumatism of an operative procedure should on *a priori* grounds certainly be as well borne.

Two years ago, while making some investigations on the cerebro-spinal space, I was privileged by the obstetrical department to autopsy a number of the children, who were stillborn or who had survived only a few hours or days. To my surprise I found that about half of them had died with, if not

from, an intracranial hemorrhage.[10] Shortly after this Dr. Dabney consulted me in regard to an infant, 48 hours old, the first born of twins, which evidently was dying with compression symptoms. Contrasted with its normal twin the child had a very tense fontanelle, a slow pulse, slow and irregular respiration and a dilated right pupil. We operated as soon as preparations could be made. The right parietal bone was turned down and on opening the tense, plum-colored dura there was found a large, thick clot, which spread over almost the entire hemisphere. This was easily broken up and irrigated away with warm salt solution and the wound was closed. The child survived only eight hours. Since that time, however, I have had two successful operations of a similar nature, the details of which need not be entered into here except to say that preservation of warmth and avoidance of loss of blood may be regarded as the prime essentials. The procedure itself, though delicate in performance, need not entail serious consequences. In the last case a bilateral operation was performed, in order to expose both hemispheres.

The third group of hemorrhages, of which a word will be said, is of a totally different variety, being arterial in origin and intracerebral in site. Nevertheless, I am convinced that in properly selected instances much may be accomplished for these cases also, by proper operative intervention. The lesion by nature is, of course, an immediately destructive one and cannot be obviated by an evacuation of the clot; still it probably lies in our power to effectually ward off the fatality, which results from an exhaustion of the medullary centers, subjected, over a prolonged period, to an increased tension of high degree. The damage already done to the brain, however, particularly by a hemorrhage in the right hemisphere, is not necessarily incompatible with subsequent physical and mental activities of a high order.

None of the cases of apoplexy upon which I have operated, have recovered; improvement, however, after the trepanation was considerable in all of them in spite of the fact that only those patients were subjected to the operation, who, at the time, were profoundly unconscious and for whom death seemed imminent. For two or three days the condition of one of them was so much better that hopes of recovery were entertained; but he succumbed, apparently from an inhalation pneumonia. In view of the fact that no anæsthetic had been necessary, we can only suppose that the pulmonary complication had originated during the long period of snoring and irregular (Cheyne-Stokes) respiration, that had preceded the operation.[11]

The exploration could be done much better today, I think, by employing the intermuscular operation through the temporal region to which reference has been made. Anyone who has had the experience of opening the skull and dura in a case of apoplexy and consequently is aware of the enormous degree of cerebral tension encountered, would hesitate to expose the brain in another, similar case, unless safeguarded by an intermuscular means of approach. Fortunately, the temporal region furnishes the nearest access to the usual large capsular clot; and according to my experience, when a sufficient opening has been made down to it, the clot will practically extrude itself.

The only case of actual intracerebral hemorrhage which I have seen recover after operation was in a patient from Dr. Thomas' clinic in whom the bleeding had followed a penetrating stab-wound of the left superior parietal region. This had produced an extensive contra-lateral hemianæsthesia, astereognosis, loss of muscle sense and word blindness. At the operation the cortex was incised in the track of the puncture and on reaching the hemorrhagic cavity, clots, amounting to about an ounce, extruded themselves with immediate subsidence of the increased tension. This patient still retains some blunting of stereognostic perception in the right hand; but all of the other sensory symptoms disappeared within a few days after the operation.

There are many other intracranial conditions that promise to have an essentially operative therapy when our knowledge of the underlying mechanical conditions has been increased. As one example may be mentioned internal hydrocephalus with its oft accompanying maldevelopment of the spine—a condition which hitherto has successfully baffled all efforts to secure satisfactory remedial measures. In the series of cases (now six in all) observed during the past few years at the Johns Hopkins Hospital and in which drainage into the retroperitoneal space by trephining the vertebra, has been carried out, it seems that the nearest approach to a rational operation has been attempted, and the results in three of the cases have been most encouraging. But it is necessary before going any farther, to learn something more of the mechanical factors which lead to the condition, by further experimental study of the normal course of the circulation of the cerebro-spinal fluid, and if possible, by the experimental production of these anomalies in the lower animals.

Similarly, drainage of the meningeal spaces, when they are infected, is by no means a hopeless surgical problem, although much is to be learned by experience of ways and means to this end. One patient that was operated upon some years ago, for a purulent (staphylococcus aureus) spinal lepto-meningitis, after irrigation and prolonged drainage, entirely recovered from the local infection. His death occurred six months later from the complications of a pyo-nephrosis and at the autopsy, beyond the slight scar in the dura, Dr. Flexner could observe no macroscopical evidence whatever of any preexisting infection.[12] In the epidemic forms of meningitis, though a few cases presenting serious compression phenomena, have

[10] The lesion frequently found was a rupture of one of the delicate cerebral veins near its point of entry into the longitudinal sinus, the vessel having been torn, doubtless, by the strain put upon it from the overlapping of the parietal bones during labor.

[11] From a physiological point of view, reference has already been made to these cases in the American Journal of the Medical Sciences for June, 1903. "The Blood-pressure Reaction of Acute Cerebral Compression," etc.

[12] This case, among others, was reported by Dr. Osler in the Cavendish Lecture, June 24, 1899.

been surgically drained and irrigated in one way or another, no permanent beneficial effects have been observed, though the symptoms frequently abate in great measure and life may seemingly be prolonged, much as by the use of frequent lumbar punctures. Similarly in one child with hemorrhagic encephalitis, the threatened terminal symptoms of the paralytic stage were warded off by a decompressive operation, but without anything more than a postponement of the eventual fatality. It is not impossible that in the slowly progressive infections of a tuberculous origin, the mere exposure of the meninges may exercise some beneficial effect, as seems to be the case in tuberculous peritonitis, by increasing the local resistance of the tissues to the spread of the disease.

Maladies, such, for example, as the major neuralgias of the trigeminus and the complications of suppurative otitis media have belonged too long to the field of surgery to need any detailed mention here. But before leaving the subject of operations upon the brain, however, I should like to say something in general of methods of procedure.

Chloroform narcosis has been advocated by the highest authority, for the reason that less bleeding accompanies operations under its administration than when ether is employed.

This is undoubtedly true, but this result is brought about through the lowering of blood pressure, the very condition that one would wish to avoid and one, which, were it desirable, could readily be assured by a certain amount of blood-letting. Ether is a much safer drug.[2] The only annoying arterial hemorrhage comes from the scalp and in the majority of craniotomies (all but basal ones) this may be controlled by the proper use of a tourniquet. The venous hemorrhage, which at times may be profuse, from the diploe, sinuses or brain, must be controlled by special methods. Posture is oftentimes of great help in lessening this form of bleeding, but an upright position is attended by some hazard unless some means of supporting the general arterial pressure is employed. In this connection the inflatable suit, the result of the ingenious researches of Dr. Crile, can often be used to advantage. With our present knowledge the doctrine that in cranial operations rapidity is all-important would certainly appear to be based upon erroneous conceptions. I feel sure that experience will show that in cranial work, as in operations elsewhere, time, in the majority of cases, is vastly secondary in importance to careful hæmostasis.

THE SPINAL CORD.

The surgical procedures, which we are called upon to carry out for spinal lesions, require no such delicacy of handicraftmanship, and present no such critical complications as those with which we have just been dealing. For purposes of localization, however, a knowledge of neurological anatomy is no less essential for work here than on the brain, and the site of each segmental unit in relation to the skeletal landmarks must be familiarized, as well as the physiological part which each of them plays. There are no clinical puzzles more interesting to disentangle, none more confusing when left in a snarl, than those connected with the segmental localization of a cord lesion; the determination from disturbances of function of its transverse extent; a decision as to the recoverability of the injured tracts; and a knowledge of just where the intact arches of the spinal vertebra must be entered in order to expose the diseased focus. The small and removable spinal cord tumors especially put one's knowledge of localization to the test. The primary growths fortunately, are usually of a benign nature; they spring from the meninges, are enucleable, and if removed early allow of complete restoration of function in the cord. Probably these meningeal (intrathecal) tumors are by no means rare, and that so few successful extirpations have been recorded in this country, is possibly due to the fact that mistaken diagnoses have been frequent, explorations have been lamentably rare, and too often localizations have been incorrectly made. A single visit to the laboratory of the Queen's Square Hospital and a view of the tumors of this nature there preserved, enables one to realize how frequently in other parts of the world they must have been overlooked.

My personal experience with spinal tumors has been small. I have had one successful case of an enucleable tumor, with complete and early recovery from the compression paralyses. In another patient, who had been treated for 17 years for transverse myelitis, a fibroma was found, the size of a man's fist, which had caused a compression erosion of the overlying vertebra. At so late a date the cord had naturally been destroyed beyond repair. In a third patient, a child, the pressure of a mid-dorsal, inclusion (dermoid) cyst had caused symptoms of a total physiological transverse lesion; a complete restoration of function has followed its removal. The other cases have been illustrations simply of invasion of the spinal canal from without, usually by malignant disease. One of these patients almost completely recovered from the compression symptoms after a laminectomy and the removal of as much of the growth as was accessible. Some months later the pressure symptoms returned with accompanying severe root pains. and a second operation was undertaken and abandoned as hopeless. Had I appreciated the intensity of suffering which this patient was destined to undergo, purely as a palliative measure I would deliberately have divided the cord at a point a segment or two above the growth. I believe this to be a justifiable measure whenever disease of a hopeless character has seriously damaged the cord and when the radiating root pains are severe.

The indications for surgical intervention in cases of spinal traumatism when there is evidence of injury to the cord, have given rise to much discussion. On the Baconian principle that "it is easier to evolve truth from possible error than from certain confusion" and for the sake of having some tangible

[2] The effect of the anæsthetic, together with other physiological reactions, reflex and otherwise, associated with operations upon the central nervous system, is best appreciated by keeping a blood-pressure chart. Such a record not only furnishes instructive and interesting general data, but often furnishes a means of properly interpreting the effects, beneficial or otherwise, of the various operative steps.

and definite rule for conduct, I have always divided these cases into three categories. (1) Those in which an operation is contraindicated because it can do no good and may increase the damage already done. To this group belongs the traumatic hæmatomyelias, a not uncommon lesion, one easily recognized from its symptoms alone and without radiographic aid, and one which, up to a certain point is recoverable by natural processes of repair. Of these cases we have had twelve. (2) Cases of fracture-dislocation, which are relatively common and which, so far as we know, are beyond all hope of restoration, owing to the complete transverse nature of the lesion. In these, operation can do no harm, but it is an unjustifiable ordeal for both patient and operator. (3) Cases of partial injury to the cord with symptoms which are increased and perpetuated by pressure from a foreign body, such as a fragment of bone or a bullet, form a group in which an operation undoubtedly will do good, provided it is so conducted as not to aggravate by further traumatism the already existing symptoms. All of these conditions are commonly regarded as surgical, and I have mentioned them for the sake of emphasizing certain limitations which should be recognized. Not a few cases of hæmatomyelia have come under my notice in which the symptoms were markedly aggravated by surgical meddling, and I have known many cases of total transverse lesion which have been needlessly subjected to laminectomy.

I do not hesitate to confess that elements of error may be present in this working division. For it is possible that certain cases of focal hemorrhage into the substance of the cord, like similar conditions in the brain, may come to be considered surgical disorders. Again we are not in a position to say with finality, that divided spinal tracts are incapable of regeneration; nor can we always be certain that a complete transverse destruction of a segment and not a partial injury with a physiological "block" of the remainder is indicated by the disturbances of function caudad to a lesion. Undoubtedly either of these conditions might give rise to an immediate total flaccid paralysis, an absolute anæsthesia up to its segmental level, a total and permanent loss of the deep, and a progressive diminution and final loss of the superficial reflexes. Collier's recent studies[1] offer strong evidence in favor of some regenerative power of the conducting paths, and they show furthermore, that the supposed symptoms of an anatomically total lesion are not unequivocal. If this assumption proves to be true, even the cases falling into my second group become as urgently operable as any, inasmuch as "the onset of the flaccid state in compression paraplegia is a sign which indicates that operative interference for the relief of pressure must be undertaken at once, if it is to be of any avail; for the total physiological abrogation from compression signifies the presence of serious evascularization, and the inevitable sequel of such ischæmia—irreparable degeneration—cannot long be delayed."

Only in the long-standing cases, therefore, which present when seen undoubted evidences of transverse destruction—no matter whether the lesion in its transverse extent originally was or was not complete—is an operation to be considered utterly futile. But though a laminectomy may avail nothing, much may be done in a palliative way even for these hopeless cases. Most important is the care of the bladder and in view of the functional isolation of the lower sacral segments, it is a wise routine practice to institute permanent drainage by a perineal or a suprapubic cystostomy. The procedure is a simple one, indeed not even requiring a local anæsthetic, for in low level lesions the perineal operation may be carried out, and, providing the cord injury be above the twelfth thoracic segment, the suprapubic route may be chosen. From either the gain to the patient in comfort and tidiness, and to the attendant in freedom from responsibility is immeasurable. Nothing is so provocative of pressure decubitus as the maceration of the skin from a dribbling bladder, and nothing so inevitably follows frequent catheterization as a terminal infection.

Did the scope of this address permit, many other problems connected with the surgery of the spine might be considered, for example: Under what circumstances should the pressure palsies following a tuberculous spondylitis be treated by the open method? What may we expect from sensory root division or excision of the dorsal root ganglia in the intractable neuralgias which may follow amputations or herpes zoster? What diagnostic value is to be attached to the measurement of tension as well as to the cellular content and chemical composition of the cerebro-spinal fluid obtained by lumbar puncture? What of the administration of medicaments by this route and for what physiological reason has spinal anæsthetization by cocaine fallen into disgrace? The discussion of these questions must be left for another occasion.

The Peripheral Nerves.

Of the many comparatively new discoveries that have a practical bearing upon the surgery of the peripheral nervous system, both somatic and splanchnic, much could be said, both in regard to the successes as well as in explanation of the failures in this more familiar field of neurological surgery. At present I must content myself with the brief presentation of some few of them.

The process of repair, that precedes the restoration of function in injured and degenerated nerves, represents the key to the situation. This must be found before the last word on nerve suture and nerve anastomosis can be said. Some of the most important and suggestive pieces of scientific investigation of recent years have been directed toward the solution of this problem, and, although the question is not yet ended, many of the facts, which have been brought to light during its course, have proven of clinical importance through their practical applicability. The doctrine, commonly accredited to His, that each nerve fiber is an outgrowth of a single cell, the two making a nerve unit, for a long time met with almost universal acceptance. More recently, however, strong opposition against this view has developed owing to the studies of Bethe, Nissl,

[1] Collier, The Effects of Total Transverse Lesion of the spinal cord in Man. Brain, 1904, Vol. 27, p. 38.

Dohrn, Schultze and others, who claim that the fibers do not grow out from the central nerve cells, but arise independently in the periphery from chains of cells which ultimately represent the sheath of Schwann and which only secondarily become united with the central cell. If this view proves to be correct, and if the histological and functional changes, which Huber and Howell, Bethe, Ballance and Stewart, and many others, have observed to take place in the peripheral end of a divided nerve, without any discoverable reunion with its central end, prove actually to be regenerative processes of the nerve, the possibilities of future work on the peripheral nerves promise to be enormous. If, for example, in anterior poliomyelitis, though the central cell is destroyed, there is some tendency toward restoration on the part of the Schwann cells of the fiber itself, there will be at least, a preparedness of the fiber, if subsequently given an opportunity, to make functional connections with other cells.

It must be confessed that the unequivocal acceptation of these views of peripheral autogenetic regeneration has received something of a check through the more recent publications of Langley and Anderson,[15] who have indicated some of the possibilities of error, particularly in Bethe's investigations. Again, the recent discoveries made by Dr. Harrison[16] can hardly be brought into harmony with Bethe's views. This investigator has shown that, if, in a frog embryo, the ganglionic crest, destined to give rise not only to the dorsal root ganglia but also to the cells of Schwann, be removed, naked motor axis-cylinder processes will grow from the remaining intact ventral portion of the rudimentary cord, and make their normal functionating connections with the muscle plates. Further, in studying the outgrowth of the fibers from the cells he has observed that there is a definite wandering or amœboid property of the axis-cylinder process—a discovery which, if correct, completely disproves the postulate of Hensen, that there is some original connection with the periphery which serves during growth to draw the nerve out to its ultimate terminus. Harrison's observations, on the other hand, would indicate the existence of an active outgrowth, influenced by some chemical affinity for its field of destination. In some such way it would seem, the central ends of divided fibers of the adult actively tend to regain their peripheral connections and succeed in doing so unless there be some mechanical interference in the tissue to prevent this. Whether or not there is an autogenetic process of repair in the isolated end of the fiber, or whether the central cell plays the entire part, or, what is not improbable, whether both factors are together concerned,[17] must for our purposes be looked upon as a secondary consideration; it is this normal active chemotactic tendency to unite which chiefly concerns us. In their laboratory experiences, investigators into the problems connected with autogenetic regeneration, have found that the greatest difficulty arises from the fact that it is almost impossible to prevent some reunion of the divided nerve fibers, with their original central ends, or with the central ends of fibers from other sources, which have been unavoidably cut through during the operation. This fact is worthy of mention, because we have long been taught that such a reunion is not to be expected, unless the fibers of a severed trunk are encouraged to find their proper connection by a surgical approximation of the stumps with suture or other means. It seems probable on the other hand, that, unless there has been some gross error in technique—as from the accidental interposition of some other tissue, or a loss or necessary extirpation of a large portion of a nerve, the ends will reunite of their own accord. In the case of the smaller, peripheral nerves, divided during an approach toward deeper parts, we know this to be the usual result, and the more dry and skillful and careful the dissection, and the more painstaking and accurate the apposition of the parts during the closure of the wound, the more complete and rapid will be these reunions. Perhaps these changes can be best appreciated by making a careful study of the post-operative areas of cutaneous anæsthesia and motor palsies after extensive dissections such, for example, as are necessitated during a complete excision of the glands of the neck. In these cases an examination will show that, when the wound has been carefully closed, the anterior cutaneous branches of the cervical plexus and the spinal accessory, which are almost always injured, invariably reunite, even when no attempt has been made to suture them, whereas after a rough operation and a hurried and careless closure of the wound, they will not. The same thing is true after operations over the parotid region in which the N. facialis is so liable to injury. We have always been taught that incisions in this region should be made parallel to the facial fibers, but the text-books in general contain no such warning in regard to operations elsewhere on the body (except in regard to the musculospiral, external popliteal nerve and a few others), because the resultant disturbance, whether motor or sensory or both, being unobtrusive and unlooked for, escapes observation. But to take these points into account even in the case of the smaller and less significant nerves should not be regarded as finicky surgery. Avoidance of injury to nerves, large or small, must always be a desideratum in operations. Here, however, I would only emphasize the fact that after such divisions as are often unavoidable, a careful approximation of the tissues, the avoidance of blood clots and points of necrosis—the organization of which increases the density of the resulting cicatrix—will serve to bring the severed ends of the nerves sufficiently near together, so that the chemotactic influence, whatever it may be, will suffice to bring about reunion. The same is true of the larger nerve trunks, and I doubt not that the suture material used in apposing the stumps of divided nerves,

[15] Autogenetic Regeneration in the Nerves of the Limbs. Journal of Physiology, 1904, Vol. 31, p. 418.

[16] Neue Versuche und Beobachtungen über die Entwicklung der peripheren Nerven der Wirbeltiere. Bonn, 1904.

[17] It does not seem at all improbable that it may be some chemical affinity, exerted by the proliferating cells of Schwann at the periphery upon the amœboid-like downgrowth of the axis-cylinder processes, that leads them to their proper destination. Both factors may, on such an explanation, be actively influential in the regenerative process and not one of them alone.

by increasing scar-formation, frequently serves to defeat the very ends for which it has been employed.

Langley in the course of his investigations was the first, or among the first, to put to experimental test the possibility of nerve crossing, through which has been opened up such a promising field for peripheral nerve operations. During the process of reunion of a divided nerve it is hardly conceivable that each fiber will make connection with its own original fiber in the peripheral stump and thus find its way to its original end organ. If this is so, why should it not be possible to graft the peripheral end of one severed nerve, whose central connections have been destroyed, with the central end of another nerve of like nature, which has not suffered injury? It has been shown that not only is this possible, but that, at least for the extremities, a reeducation of the central activities takes place, particularly in young individuals, to such a degree that practically the normal function is resumed, one group of cells sufficing to preside over its own, as well as over the territory of the nerve originally injured, proving itself capable, as it were, of driving a team as well as a single horse. More simple even than in the case of mixed nerves would seem to be possibilities of anastomosis between two purely somatic efferent nerves, and the idea of grafting a neighboring intact motor nerve into a paralyzed facial branch, in the hope of overcoming the seriously obtrusive deformity, occurred a few years ago almost simultaneously, to surgeons in England, France, Germany and this country, and was acted upon with results which doubtless are known to you."

In three of my own cases I decided upon the spino-facial form of anastomosis; and though the hypoglossal, from what would appear to be merely conjectural reasons, is favored by others, the functional results after the latter operation seem in no instance to have been comparable with those after the spino-facial grafts. But no matter by what method they may be performed, anything short of an absolutely perfect result in these cases will show itself plainly by some asymmetry during the finer expressional movements. This would not be the case after anastomoses between the limb nerves and it is here, in dealing with the paralyses of anterior poliomyelitis, that we may expect to find the field of greatest promise for the application of these principles. Let us take a simple illustration. Terminal paralyses or palsies of certain groups of muscles characterize the residual features of an anterior poliomyelitis. The destruction of the ventral-horn cells is most intense in certain spinal segments;[10] the cells of the adjoining ones, having suffered less severely, ultimately resume their normal activity and so, up to a certain point, the early wide-spread paralyses disappear. Thus, let us suppose that the ventral-horn cells, which give rise to the fibers of the peroneal nerve and which are clustered largely (?) in the first sacral segment, have been for the most part destroyed. A paralysis of the peronei and of the extensors (dorsal flexors) of the toes and ankle results, leaving the foot and ankle unbalanced and often useless, owing to the lack of opposition to the pull of the sound flexors and supinators. If done at the proper time, an intentional section of the degenerated peroneal nerve and an implantation of its peripheral stump into an incision made into the functionally intact internal popliteal, should restore the balance as no tendon transplantation could possibly do; for, unless there is some flaw in the entire argument, the divided central ends of the internal popliteal fibers should, without discriminating between them, grow down and make connections with the originally degenerated fibers of the peroneal and also with the newly degenerated ones that lead to the nerve's natural field of peripheral distribution. Many of these operations have already been done and it remains only to determine the time most advantageous for the anastomosis. It is probable that after it has become evident what the extent and what the seat of the residual palsy are likely to be, the earlier the operation is carried out the greater will be the probability of success. Possibly just when the peripheral changes in the degenerated nerve, supposed to be reparative in nature, are at their most active stage, may be the most desirable time. Certainly after these changes—whatever be their nature—have retrogressed and the muscle spindles and end-organs have atrophied, the chances for restoration of control are much diminished.

More complex problems arise when the paralyses are diffuse and scattered; as, for example, when the movements at the knee and hip are affected or the upper arm is palsied. On one child from Dr. Thomas' clinic, that presented this extreme type of paralysis with an involvement of all four extremities, I have done several operations. In the upper part of the cord the fifth cervical segment was particularly the seat of injury, the deltoids being absolutely, and the biceps and supinator muscles in large measure paralyzed. The spinal accessory has been sacrificed and transplanted into the upper radicle of the brachial plexus. Anastomoses have likewise been made on each of the lower extremities. On the side most seriously crippled, the N. femoralis being the only nerve that had remained in large part intact, it was anastomosed in the pelvic fossa with the obturator and first radicle of the sacral plexus with the hope of restoring power, in the thigh, sufficient to let the child stand and possibly walk. Of course, in cases of this kind, no tendon transplantation could be of service.

It is quite possible that there are other maladies which may be greatly benefited by measures conducted along these same lines. Kennedy, it will be remembered, cured a patient, who was suffering from an extremely trying facial (motor) tic, by deliberate division of the N. facialis and an immediate spino-facial anastomosis. I have recently had a similar case. After reading some of Bethe's experiments, I have vainly looked for a proper case in which to anastomose central end to central end

[10] The bibliography of the subject will be found in Ballance and Stewart's article in the London Lancet, May, 1902; and at the end of the writer's paper in the Annals of Surgery of the same date.

[10] Segmental in much the same way as is the best known of the diseases of the dorsal-root ganglion cells (herpes zoster) for which Head has suggested the name posterior poliomyelitis. The toxic agent, whatever it may be, in each disease has an especial affinity for one or the other variety of these cells. There is usually a rapidly acquired immunity which spares the remaining cells, and which usually persists for life.

of the nerves of an amputation stump, when there existed an intractable neuralgia originating in the so-called amputation neuromata. Unions of this nature, the "polarity" of the opposed ends being the same, are of course, unaccompanied by any functional transmissibility in the nerve, but they probably would suffice to prevent the formation of the terminal and painful tangle of outgrowing axones.

The possibilities of nerve anastomosis do not end here with the grafting of like upon like, for Langley has demonstrated the surprising fact that nerves, normally subserving a different function, may, under favorable circumstances, be interposed. Thus he and Anderson[20] found that certain somatic efferent nerve fibers, such as are contained in the fifth cervical nerve, are capable of making a functional union with the preganglionic fibers of the cervical sympathetic, and vice versa. For example, the preganglionic fibers of the sympathetic may unite with the peripheral ends of the recurrent laryngeal, phrenic, or spinal acessory. It is quite within the realm of probabilities that this principle may be applied to a great number of neurological conditions, to cases of bulbar palsy for example, or to restore tone in the muscles of a paralyzed larynx, however it may have been produced.

With these crude generalizations I must close this section of my paper on the peripheral nerves, leaving much unsaid of the particular operations such as those for torticollis, for paralyzing lesions of the brachial plexus—whether from injuries at birth or in adult life, of neurectomy for Bernhardt's paresthetic meralgia, of the operations for tetanus suggested by the discoveries of Meyer and Ransome,[21] of cervical sympathectomy for glaucoma and exophthalmos, and, indeed of the entire surgery of the sympathetic, a large subject of itself. The particular disorders of many individual nerves—the trigeminus, for example, in its relation to congenital nævi, herpes, morphœa, neuralgia and other phenomena of disease—would alone be enough to write a book upon.

And now that all has been said, which may justly be crowded upon the pages of a single address, may I, for a moment, in closing, return again to my introductory theme? In talking the matter over with my surgical friends, many of them have expressed themselves emphatically against any form of operative specialization. But, granting the wisdom and necessity of a general surgical training beforehand, I do not see how such particularization of work can be avoided, if we wish more surely and progressively to advance our manipulative therapy. Are practice of hand and concentration of thought to go for nothing? Whether as the result of individual fitness, or opportunity, or training, certain things must be better understood, and, from purely a handicraftman's point of view, better done by one man than by another. Gowers has said that "the separation of medicine from surgery is itself specialization."[22] In this sense everyone specializes, and the misfortune to medicine of its long divorcement from surgery, its only inductive branch, has been recently emphasized by Clifford Allbutt. We all are, or should be primarily internists, but although all build on the same foundation, some by inclination or fitness prefer the mechanical side of therapy. The same principle applies to the sub-departments of medicine, and in this particular field of neurology some of those who finally focus their studies in this direction, must, in aid of their scant therapeutic resources, do their own operating.

What Billroth, in the early days of abdominal surgery, said of the future of medicine in general, is just as applicable to this smaller field: "Die innere Medizin müsse mehr chirurgisch werden."

[20] Langley and Anderson, The Union of Different Kinds of Nerve Fibers. Journal of Physiology, 1904, Vol. 31, p. 365. This, their more recent publication, contains a summary of the earlier work which has appeared under various titles.

[21] Archiv f. Exper. Pathol. u. Pharm., 1903, Vol. XLIX. They have shown that the neurones are protected with remarkable efficiency against circulating tetanus toxin, and that the central cells are reached only by way of the long paths of their axis-cylinder processes, which must first suffer injury before the poison can effectually enter them. The long incubation period is taken up with this slow process of attack through the muscle "Endorganen." The toxin travels cellulipetally after entering the nerve fiber and thus it is possible by an early exposure of the nerves, central to the point of lesion, and by the local (intra-neural) injection of antitetanotoxin to effectively combat the progress of the intoxication.

[22] I wish to quote, in this connection, a paragraph of some historical interest from John Morgan's "Discourse upon the Institution of Medical Schools in America," Phila., 1765.

"First, I propose to confine myself, in practice, to those cases which belong most immediately to the office of a Physician, that I may prescribe for and attend such cases to greater advantage. I shall therefore avoid, all I can, interfering in the proper business of surgery, viz., manual operation."

TUMOR OF THE PARATHYROID GLAND.

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Two tumors arising from the parathyroid gland have been described, the first by Benjamins[1] and the second by Erdheim.[2] In Benjamins' case a tumor the size of a child's head developed rapidly in the thyroid region and was extirpated. It was surrounded by a capsule in which at one point a normal parathyroid was found. Its substance was made up of broad strands and masses of epithelial cells resembling those of the normal parathyroid, with very slightly tinged protoplasm and vesicular nucleus. Toward the connective-tissue stroma there was almost everywhere a palisade row of cells taller and with

[1] Benjamins, Zieglers Beitrage, Bd. 31, 1902, p. 143.

[2] Erdheim, ibid., Bd. 33, 1903, p. 158.

deeper staining nucleus than the rest. Occasional colloid droplets were seen.

Erdheim describes a nodule 2½ x 1½ cm. in size, found at an autopsy in an 18-year-old person, at the lower pole of the thyroid, without being more directly connected with that organ. No other parathyroid glands could be found. Microscopically this tumor consisted of strands and irregular masses of cells with relatively sparse vascular supply in the delicate stroma. The cells corresponded with those of the normal gland, even the oxyphile cell groups being found. Colloid droplets were observed between the cells although there were no definite follicles. In one section a cyst was found, lined with one layer of cells and containing degenerated fatty cells. Erdheim suggests the possibility that since the other parathyroid glands were not to be found this may have begun as the result of a work hypertrophy, which gave the impulse to tumor formation.

At an autopsy in the case of a young man æt. 26, who had suffered for several years from symptoms of a chronic nephritis and on whom two years ago the operation of decapsulation of the kidney had been performed in the Johns Hopkins Hospital, there was found on the right side just below the lower pole of the thyroid and quite separate from it a round smooth mass enclosed in a delicate capsule and lying in the loose connective tissue. This mass measured about 2 cm. in diameter was almost spherical, being somewhat flattened. Externally and on section it was of a uniform opaque whitish-yellow color and in consistence was rather soft. On section the cut surface of the homogeneous slightly granular substance of the mass bulged outward. In the center was a small cavity with smooth walls containing a clear fluid. The mass was not richly supplied with blood-vessels.

Two well formed parathyroid glands were found which both macroscopically and microscopically were normal. The thyroid was normal throughout. Otherwise the chief lesion to be noted was an advanced chronic diffuse nephritis. The patient died in uræmia.

The mass was fixed in Zenker's fluid. Microscopically it proved to be composed of a tissue which, as in the cases of Benjamins and Erdheim, most closely resembles that of the parathyroid. There are strands and very large anastomosing branched masses of cells which are separated by a relatively delicate stroma which bears the blood-vessels. Compared with the normal parathyroid, the blood supply is extremely meager. The columns of cells are usually solid, the cells being packed together and pressing one another into polygonal forms. Sometimes there are as many as 24 cells abreast in such columns, but most of the strands are not so bulky and may be so small as to contain only two or three cells abreast. Some of the larger solid-looking masses are found to be permeated by a network of filaments of the stroma, bearing blood-vessels. The cells are quite as they are in the normal parathyroid showing vesicular nuclei and protoplasm which may be faintly granular or perfectly clear and free from any stainable granules. Solid masses of these latter cells occur and there is one especially large wedge-shaped area composed of them alone. Large and small groups of cells corresponding precisely with the normal oxyphilic cells of the parathyroid are scattered here and there among the other cells. Their protoplasm has the appearance of ground glass and takes a deep eosin stain. Their nuclei vary somewhat in size, but stain more deeply than those of the other cells. Mitotic figures of great beauty occur in all these cell forms.

The palisade arrangement of the peripheral cells is not especially striking in the great mass of this tissue, nor does it seem so to me in the normal parathyroid. There are certain of the masses of cells, however, in which a central cavity is found about which the cells are often arranged as a palisade. This is less marked when the cavity is surrounded by many rows of cells than when its wall is formed, as it frequently is, of a single row in which the cells then become high and columnar with the nucleus peripherally placed. These cells sometimes appear to possess cilia, but of that I cannot be sure as they are very imperfect. Not only the ordinary cells but the very clear variety and the oxyphilic cells may take part in forming the walls of these follicle-like cavities. The cavities are sometimes rounded and small, sometimes quite large and elongated or branched. They contain sometimes a finely granular coagulum, as if a thin watery albuminous fluid had been coagulated there by the fixing fluid. Oftener they are filled with bubble-like vesicles of about the size of red corpuscles and somewhat resembling shadows of those cells. The variation in their size, however, makes it seem that they are really analogous to those vesicle-like structures, so frequently seen in the renal tubules. Desquamated epithelial cells also occur there and occasionally red corpuscles. In one or two alveoli there are masses of red corpuscles, some well preserved, some broken down, together with particles of blood pigment, indicating that a hæmorrhage had occurred some time before death.

Of colloid-like material there is practically no trace either among the cells or in the alveolar spaces.

The larger cavity which was opened in cutting through the mass is found to be lined with one layer of flattened epithelial cells, which have been in large part desquamated. It contains a fluid a little of which has adhered to the lining wall and is coagulated into a finely granular almost colloid-like pink staining material.

The capsule is delicate and consists of fibrous tissue into which the epithelial cells do not extend.

It is evident that except in bulk, in the size of the cell masses and in the formation of such definite cavities this growth differs in no way from the normal parathyroid unless it be in that there is no adipose tissue between the cell strands. The question therefore arises as it did in Erdheim's case as to whether we should regard it as a tumor or as the result of a compensatory hypertrophy. Erdheim was moved to the suggestion of the possibility of a vicarious hypertrophy by the absence of the other parathyroid glands. In this case, however, two other normal parathyroids were present. On reviewing the anatomical conditions elsewhere in the body, the only

other suggestion that arises is the possibility that in the state of extreme renal insufficiency, which had existed for so long, extra demands might have been made upon the parathyroid.

Two other cases of advanced chronic nephritis in young persons were studied and in the parathyroids in one abundant mitoses were found, while none were to be seen in the parathyroids of the other.

No evidence of invasive growth is to be found, and in the absence of any convincing explanation for a compensatory hypertrophy it seems that we shall have to speak of this as an adenomatous new growth, while recognising the fact that many so-called adenomata in glandular organs have turned out to be evidences of compensatory or regenerative hyperplasia.

BACILLUS VIOLACEUS MANILÆ.

(A PATHOGENIC MICRO-ORGANISM.)

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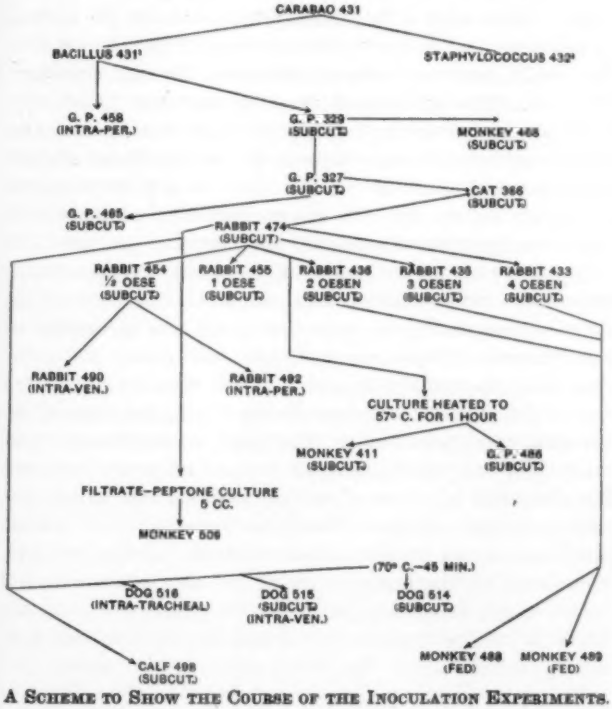
(*From the Government Biological and Serum Laboratories.*)

I can find no account, in literature, of a pathogenic organism similar to the one of which a description follows, but there are one or two bacilli, which resemble it so closely in morphologic and cultural characteristics, that it seems wisest to consider the present germ as simply a variety of certain well-known but, at least usually, non-pathogenic forms.



A SCHEME TO SHOW THE COURSE OF THE INOCULATION EXPERIMENTS.

The group, to which reference is made, is the one the individual members of which are discussed collectively by Migula (System der Bakterien, 1900, II, 939), under the title of *Pseudomonas violacea*, and which are separately described by other authors as *B. violaceus, B. violaceus Berolinensis, B. violaceus Lutetiensis, B. violaceus Laurentius*, etc.

The organisms are described by these authors as bacilli, which are short or of medium length, sometimes somewhat bent, and with rounded ends. The measurements are about 1 x 0.65 μ, although some individuals may attain a length of 3 μ. In cultures on agar and potato, formations much resembling spores, but which are like these reproductive bodies in appearance only, are seen within the individual rods. These pseudo spores are considered to be either plasma globules, or vacuoles, and true spores have not been demonstrated. The rods are motile; sometimes, as in cultures kept at body temperature, quite actively so. They possess a single polar flagellum. Deep colonies in gelatine have an irregular rounded appearance, with projecting filaments. On the surface the colonies form small depressions, in which blue-gray masses of bacilli are seen. The color gradually becomes more intense, and the straggling filaments grow out into the surrounding medium. On agar the growth is blackish-violet. Blood serum is liquefied—peptonized. On potato the growth spreads over the surface of the medium, and forms a rich pigment, which does not stain the whole fragment of the vegetable, but only that portion immediately beneath the growth. Broth is clouded, and a dirty white sediment falls to the bottom of the tube, and takes on a pale violet color. No pellicle is formed on the surface. The organisms grow fast at room temperature, but more slowly than most water bacteria, and they do not grow beneath the isinglass. They are most readily stained with hot carbol-fuchsin, and are decolorized by Gram's method.

B. Violaceus Manilæ corresponds with the above descriptions in some details, but in some it does not. This organism is a short rod, measuring approximately 0.5 x 1.0 to 1.5μ. Occasional rods are even longer. It stains with the usual aniline dyes, best perhaps with carbol-thionin, or with carbol-fuchsin or gentian-violet diluted five times with water. It is not stained by Gram's method, and is not "acid-fast." When well stained by any of the above mentioned solutions, it appears as a short, thin bacillus, very frequently slightly bent, and with rounded ends. It does not, as a rule, stain uniformly, and may show one or more clear spaces which are not tinted, and which appear remarkably like spores. These clear spaces cannot be stained by the usual methods used in

coloring spores. The organisms are generally single, sometimes in pairs, occasionally arranged in short chains of 3 or 4 individuals. They are motile, usually sluggishly turning and twisting, but frequently single rods may be seen to cross the field of the microscope with a more rapid, wriggling motion. Each organism possesses one polar flagellum. In rare instances two flagella may be distinguished springing from the same pole of the bacillus.

On agar plates, within 24 hours at 37 degrees C., colonies appear as small, round, violet-gray spots. These slowly enlarge and become deeper in color. The maximum depth of color is attained in from 48 to 72 hours. As the colonies grow, their margins become slightly irregular, and with a rather indefinite concentric arrangement of layers, which are somewhat thicker towards their peripheries, with the result that the centers of the colonies have a less intense blue color than the edges. These masses of organisms are slightly tenacious, but after removal from the medium are readily dissociated in water. The growth on agar slants is similar to that on plates; extension being slow, but rather even, resulting in a very slight crenation. The water of condensation is clouded and bluish, with a blue sediment. In stab-cultures in agar the growth is scant, and no pigment is formed below the surface.

Gelatine is liquefied slowly at the temperature of the ice-box, the growth forming a funnel-shaped area with a cup-shaped upper portion. The sediment is bluish.

Bouillon is diffusely clouded. A delicate pellicle is formed, which, upon 1 per cent alkaline material, is but slightly pigmented, but which is better developed and bluer on a 1 per cent acid liquid. The sediment in 1 per cent acid bouillon is pale violet-blue, and rather viscid.

Dunham's peptone solution is also clouded, and a thin pigmented pellicle is produced. A sediment is deposited in this medium, which resembles that in broth, but in which more pigment is present. The whole medium becomes diffusely bluish within 48 hours.

On potato the growth extends over the whole surface of the medium, and to the water of condensation. The pigment production is luxuriant. The superficial layers of all the solid medium are stained by the soluble blue pigment. In sugar-containing media—glucose and lactose—no gas is formed.

The reaction of milk, after seven days, is slightly acid, but there is no coagulation. However, the casein is peptonized, and the upper third of the tube becomes almost clear, being faintly violet.

The organism thrives better and produces pigment somewhat more freely at 37 degrees C., than at lower temperatures; it does not grow at all well, and does not produce any pigment, below the surface of a solid medium. It is almost an obligatory aërob. It is killed by boiling for one minute; by a temperature of 67 degrees C., after an exposure of 5 minutes; and by a temperature of 57 degrees C. after one hour. It does not form spores.

The pigment is soluble in alcohol, giving a deep, rich, violet solution. It is slightly soluble in water, barely dissolved in ether, and insoluble in chloroform.

The organism described above has been isolated from three carabaos, which died suddenly with such noticeable absence of clinical symptoms, that acute hemorrhagic septicæmia was suspected. In two of these cases, Dr. Jobling obtained cultures of this organism from the lymph-glands and lungs, and in the third case the writer found it predominating in cultures from the same organs. Later on, in the press of work, the cultures from the first cases were lost, and only those from the third were used in the following investigation. However, Dr. Jobling had injected his organisms into guinea-pigs, producing the same kind of lesions which I shall describe. The details of the first autopsies are meager. Little can be said, except that the prescapular glands resembled those to be described in connection with the third case.

Like the first ones, the third animal died suddenly. It had had no rise in temperature, as far as the records of the corral show, and symptoms of rinderpest were absent. On removing the hide, none of the gross lesions of hemorrhagic septicæmia or surra were encountered—neither hemorrhages nor œdemas. The prescapular glands were enlarged and intensely injected, but neither showed true hemorrhages nor necrotic areas. There were a few small petechiæ under the visceral pericardium, and under the endocardium of the left ventricle. The lungs were not collapsed, but were for the most part crepitant. The surfaces of these organs were dotted with small pale areas varying in size from that of a pinhead to a small hazel-nut. These areas were firm and projected slightly above the surface of the pleura. They were not round, but irregularly stellate, and each was surrounded by an appreciable zone of congestion. On section they appeared granular and gray, and with no indication of caseation or suppuration. Other non-crepitant areas, which occurred chiefly along the anterior margins of the lungs, had much the appearance of red infarcts. They were dark red, and raised above the general surface of the organ in which they occurred. On section they were dark and moist, simulating the stage of red hepatization in pneumonja. The lungs on section were generally pale and œdematous, and in their substance contained large numbers of the small miliary nodules, similar to those seen upon their surface. The spleen appeared to be normal. The liver showed no macroscopic changes. The gall-bladder was somewhat larger than normal, but the stomach showed no pathologic lesions visible to the naked eye, nor were any found in the trachea, pharynx or tonsils. The kidneys were perhaps a trifle pale. The intestinal tract was normal.

Smears from the prescapular glands showed a few very small organisms, which appeared as diplococci or polar-stained bacilli, and a large number of somewhat larger rods; some of these irregularly stained, and others curved. Cover-glass preparations, made from the nodules of the lungs, showed almost nothing but small bacilli, which stained unevenly. Smears from the heart showed no organisms.

Cultures from the blood gave no growth after some days, and those from the lung lesions produced a few colonies of

a large thick bacillus, resembling B. subtilis, and other colonies in very much larger numbers, (in one plate, these latter only), which developed a blue color after 24 hours at 37 degrees C., and which were composed of the organisms which have been described. In cultures from the prescapular glands two organisms were demonstrated. One was identical with the chromogenic one isolated from the lungs, the other was a small coccus arranged mostly in clumps, which, after several days, produced a very faint yellow color. Both of these organisms, the coccus and the chromogenic bacillus, were studied carefully. One was in all probability a modified staphylococcus aureus, which produced a minimum of pigment, coagulated milk very slowly with coincident reduction of the litmus, and which did not kill guinea-pigs in reasonable doses, either when injected into the peritoneal cavity, or under the skin. The other has been described in its cultured and morphological character, and corresponds quite closely with Bacillus violaceus (Schröter), or Pseudomonas violacea (Migula). In none of the books, to which we have access, have I been able to find any reference to the pathogenicity of Bacillus violaceus. This makes the following experimental study of some interest:

One cubic centimeter of a 48-hour-old culture from the lung of the carabao (No. 431), was injected under the skin of a guinea-pig (No. 329). The animal became quite ill within the next 24 hours, and a large semi-fluctuating mass appeared at the site of the inoculation. Coincidently, the temperature, which previously had been running between 36.5 degrees and 38.4 degrees C., rose to 39.8 degrees C., and then dropped gradually until the animal died. Death occurred on the fifth day after infection.

At autopsy a large area of necrosis was found under the skin about the point of inoculation. This was surrounded by tissue in a state of coagulation necrosis, in which were occasional lacunæ filled with a dark gelatinous material. There was no true pus, and no hemorrhages appeared, although the adjacent tissues showed extensive congestion. The peritoneal cavity contained a small amount of a clear fluid. The lungs were the seat of large and small hemorrhagic infarcts, the lower lobes of both sides being almost completely infarcted. The spleen was markedly enlarged, was very dark, soft and mottled with miliary gray spots, resembling focal necroses. The liver was also thickly studded with similar areas. There were no macroscopic lesions in the heart or kidneys, though the latter were pale. The adrenals were markedly enlarged, their medullæ congested and with small areas of necrosis in the cortices. The lymph glands of the axillæ and groins were enlarged and injected. Nothing abnormal was remarked in the intestines, stomach or bladder.

Smears were made from the subcutaneous tissues at the site of the primary lesions, from the lungs, spleen, liver, lymph glands and heart. All save those from the heart showed numbers of rods morphologically identical with those which had been injected. the organism was recovered in pure cultures from the liver, peritoneal cavity, lungs, the primary lesions and the heart.

A second guinea-pig (No. 458), was inoculated intraperitoneally with one-half of a cubic centimeter of a bouillon culture obtained from the carabao. It survived the operation.

From the cultures obtained from the first guinea-pig, a second (No. 327), was inoculated with ½ cc. of an emulsion made with three loopfuls of a 24-hour-old agar culture in 5 cc. of a normal salt solution. The animal died on the third day after inoculation. The anatomical picture was the same as that in the first guinea-pig, except that in the lungs small miliary necroses were present in place of the infarcts noticed before. Pure cultures of the experimental organisms were obtained from the heart, liver and the subcutaneous lesions.

With 1 cc. of an emulsion, made with 3 loopfuls of the organisms, obtained from this last animal, and 5 cc. of salt solution, a rabbit (No. 474) was inoculated subdermally. It died within 36 hours. Autopsy showed a bloody fluid in the peritoneal cavity, a wide-spread hemorrhagic lesion at the site of inoculation with no suppuration, but with necroses in the liver. The organisms were recovered in pure culture from the peritoneal cavity, liver and heart. At the same time, a guinea-pig inoculated with an equal amount of the same material, died within 20 hours. The only macroscopic lesions were miliary abscesses of the liver. Cultures were obtained from the heart, liver and peritoneal cavity.

A cat (No. 366), was inoculated under the skin of the belly with 1 cc. of an agar suspension of a culture obtained from guinea-pig No. 327. The succeeding day a large semi-fluctuant mass surrounded the point of inoculation. The second day after infection, this abscess was discharging externally by a sinus, the edges of which were ragged, and about which the skin was semi-necrotic. Eventually, all the skin about this first sinus sloughed, leaving an ulcer measuring 5 x 5 cm., whose base was on the subjacent muscles, and whose edges were regular, indurated and undermined. This ulcer gradually healed, and the animal showed a complete skin on the 30th day after inoculation. When recovery had been established, a second dose of a suspension of the organism from No. 474 was introduced hypodermically. No lesion was produced. The serum from this animal taken at this time agglutinated the specific organisms in a dilution of 1-60 after about 40 minutes; in dilution of 1-200, after about 1 hour and 15 minutes.

Five rabbits were inoculated with different amounts of the organisms to show what variations occurred in the lesions, if possible. The first (No. 454), received ¼ a loopful, the second (No. 455), one, the third (No. 436), two, the fourth (No. 435), three, and the fifth (No. 433), four, of a culture obtained from rabbit No. 474. All of these animals died; Nos. 454, 455 and 436 in three days, No. 435 in four days and No. 433 in five days after inoculation. From all, the organism was recovered from the tissues and heart's blood, except in two cases (No. 435 and 436), in which the cultures from the heart were negative.

The progressive changes in the organs of these animals was noticeable and interesting. In animal No. 454 the subcutaneous jelly-like œdema was present; there were miliary ab-

scesses in the liver, none in the spleen, none in the lungs, which were simply injected. In animal No. 455 there were a few nodules in the lungs and in the liver; the other organs appeared like those in animal No. 454. In animal No. 436 there were large abscesses in the lungs, and but a few small ones in the liver. Animal No. 435 showed similar lesions. In No. 433 there were a few very small abscesses in the liver and spleen, while the lungs were generally consolidated, showing comparatively large areas composed of collections of miliary abscesses. In other words, the lesions varied as the dose of the organisms, and while with small doses the liver was more prone to be affected, with large ones the lungs were more prominently diseased. This may, or may not, be true for other animal species. At any rate, the principal feature of the pathogenic action of the bacillus is its necrotizing power.

A dog (No. 515) was inoculated subcutaneously with 1 cc. of an agar suspension of a culture from No. 474. Several days later a local lesion appeared, which resembled that produced in the cat, but which was less extensive and healed more rapidly. About three weeks afterwards, this dog received 1 cc. of similar material in the femoral vein. Following this injection the animal was irritable, eating but little for a few days. On the third day, and continuing for four days, tremors were noticed in the head and limbs, the animal lying quietly without seeming to suffer. He subsequently became entirely well.

In the case of another dog (No. 516), in which the organisms were introduced into the trachea, no illness followed.

A calf was inoculated in the dew-lap with 2 cc. of the same material which was used with the dogs. The day following inoculation there was a large, painful œdematous mass visible in the region of infection. This enlarged until it reached the size of a large fist, and then gradually disappeared.

Inoculation into the peritoneal cavity of 1 cc. of a 48-hour-old agar culture suspended in salt solution, caused the death of a rabbit (No. 492), within 12 hours. At autopsy there was nothing to be seen, except evidence of an acute peritonitis. Cultures from heart and peritoneal cavity were positive and pure.

Intravenous inoculation of ½ cc. of a 48-hour-old agar suspension killed a rabbit (No. 490), within 10 hours. No lesions were visible to the naked eye. Cultures made from the heart, peritoneal cavity, and pleura showed the organisms in uncontaminated growths.

Feeding experiments were negative. Large quantities of virulent agar cultures were fed to two monkeys (No. 488 and 489) with no ill effects.

Experiments upon serum reactions were begun with a monkey (No. 468), which had received a dose of one cubic centimeter of an emulsion made from a 24-hour-old agar culture of the organisms isolated from the carabao. The monkey did not succumb to this first subcutaneous injection, and four days later a second one was made with 1½ cc. of an emulsion made with a 24-hour-old culture of the organisms isolated from the second guinea-pig (No. 327). The day following this second injection, a small quantity of blood was withdrawn and its agglutinative powers tested. In dilutions of 1-20 a complete agglutination was present at the end of 15 minutes. In 1-40, a complete reaction was given in half an hour. In a dilution of 1-200, the result was positive and complete in one hour.

Later this animal was inoculated subcutaneously with 1½ cc. of an agar suspension made with a culture of the organisms recovered from animal No. 474. Two days afterwards a large slough appeared on the abdomen about the point of inoculation, and the animal was very ill. It was killed and the blood drained off into a sterile tube. The serum obtained from this blood was tested for its agglutinative and bactericidal powers. In a dilution of 1-200 agglutination was complete in 20 minutes; 1-400 in 30 minutes; 1-600 in 45 minutes; 1-1000 in 50 minutes; 1-2000 incomplete after 1 hour; 1-4000 was negative.

This experiment was repeated in small tubes, so that the reaction could be watched with the naked eye. The tubes were allowed to stand over night. The next day all the organisms were contained in a precipitate, except in the control tube, in which the liquid was still cloudy. Cultures made from all these tubes gave luxuriant growths. No appreciable bactericidal action was present.

To determine whether or not a soluble toxin was produced, a four-day-old culture in peptone was filtered through a Pasteur-Chamberland bougie F. The filtrate was kept at 37 degrees C. over night and no growth occurred. The next day 5 cc. of the material was injected under the skin of a monkey (No. 509). Following this there was no sign of toxæmia, no rise of temperature, nor any sign of altered health in the animal.

After it had been proved that even very small amounts of the living organisms would cause death of small animals, and at the same time produce the specific lesions without the appearance of any appreciable immunity, cultures were heated to 57 degrees C. for one hour and these dead cultures, suspended in normal salt solution, were used for injection.

This material was used subcutaneously in a guinea-pig (No. 486), and a monkey (No. 411). In the case of the monkey, 1 cc. of an agar suspension was used for the first injection. There was no appearance of a reaction until the fifth day, when the temperature rose one degree above the normal one for the animal. The day following this reaction, a second injection of the same amount of the same material was given. On the fourth day following, the blood was tested for its agglutinating powers. Complete agglutination was accomplished in dilutions of 1-400 in 15 minutes. A third inoculation was then made with 0.75 cc. (intraperitoneal) and 0.75 cc. (subcutaneous), of the same material which had been used for the other inoculations, and four days later a fourth inoculation was made with 2½ cc. subcutaneously. Two days after the last inoculation, the monkey was found dead. At autopsy there were no macroscopic lesions at the site of the last inoculation, where there was a small pocket of a bluish material. Cultures from this lesion, from the heart, liver and spleen were entirely negative, and the media was perfectly

sterile after five days. The serum taken from the heart at autopsy gave a perfect agglutination in a dilution of 1-1000 in 40 minutes. The guinea-pig suffered no harm from the inoculations.

Later, using cultures of the organisms from animal No. 474, and which had been killed by heating to 70 degrees C., for 46 minutes, a dog was inoculated with a series of injections. He remained well throughout the time. However, after the third inoculation his blood agglutinated in a dilution of 1-20 only, after one hour.

The essential lesions produced in experimental animals are found at the site of inoculation, in the lungs, liver, lymph glands and spleen.

At the site of inoculation, when infection has been caused subcutaneously, there is a wide area of necrosis with local and circumambient œdema resembling the lesions produced by the diphtheria bacillus. The whole area may undergo necrosis, become gangrenous and slough away.

In the rabbits, the œdema has been more marked than the necrosis. In the cat, the necrosis occurred with but little œdema. The monkeys showed œdema as well as necrotic and gangrenous processes, as did the guinea-pigs.

The lesions in the parenchymatous organs are miliary abscesses, which may show a suppuration stage. In the lungs and liver the surface of these abscesses may be covered with a fibrinous exudate. The bacilli are found in all the lesions.

The losses in stock due to infection with B. violaceus Manilæ, are not extensive, and there seems to be little danger of an epidemic. In all our work we have seen but these three cases. Each was in a different herd, and these herds were widely separated from each other.

So far as treatment is concerned, there is little to be said. All the animals have died so suddenly and unexpectedly, that there was no time either for experiment or speculation on this subject.

A REPORT UPON THE AGGLUTINATION REACTIONS OF THE BACILLUS DYSENTERIÆ (SHIGA) WITH THE BLOOD SERUM OF PATIENTS SUFFERING WITH SUMMER DIARRHŒA.[1]

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The accompanying table (Table I) is the summary of what is by no means intended as an exhaustive study of the problem of the agglutination reactions of *B. dysenteriæ*, but simply of the work done during the summer of 1903, at the Thomas Wilson Sanitarium as a matter of routine upon the blood reactions of the cases of dyspeptic diarrhœa. Unfortunately it does not include all patients treated at the Sanitarium during that time, for in the rush of the clinical work of midsummer many cases were of necessity allowed to pass unexamined.

The report is based upon examinations of the blood of one hundred patients (patients with two admissions with blood examinations on each admission being counted twice), in a few instances upon two or more occasions; of these 45 gave positive (including No. 287), and 55 negative results. No result is reported as positive unless the reaction occurred at a minimal dilution of 1-100, though every case was tried 1-20 and 1-50, and in the table a few such cases are recorded (136, 146, 147, 151, 161). When possible all dilutions were carried up to 1-1000, and in a few cases to 1-1500.

The relation between reaction and clinical diagnosis is seen in Table II, the diagnosis "Dysenteria infantum" being applied, as suggested by Knox, to those cases from whose stools the dysentery bacillus was isolated.

TABLE II.

BLOOD EXAMINATION.

	No. of cases.	Pos.	Neg.
Dysenteria infantum	40	26*	14
Dyspeptic diarrhœa and ileocolitis	42	12	30
Dyspeptic diarrhœa, with malnutrition	4	2	2
Malnutrition and marasmus	11	5	6
Diarrhœa, simple	3	0	3
	100	45*	55

* Includes No. 287.

Thus it will be seen that while 40 cases in a total of 86 cases of dysenteria infantum and dyspeptic diarrhœa gave a positive reaction, 5 cases in 11 cases of malnutrition and marasmus gave such reaction, and of the 3 cases of simple diarrhœa none gave such reaction. Of the forty cases of dysenteria infantum, twenty-five (62.5 per cent) gave a positive reaction and fourteen a negative one; one was not tried through oversight before serum was given on patient's second admission, (287) but it was positive on his first admission (219). This seems a large percentage of negative reactions until one analyzes these cases giving negative results. Four were cases of less than one week's duration (195, 210, 221, 222), one reacted on a later admission 1-1000 (169), one reacted 1-50 (151),

[1] This paper has appeared in abstract in the report of the Rockefeller Institute for Medical Research upon the Diarrhœal Diseases of Infancy.

TABLE I.

Clinical Number.	Clinical diagnosis.	Reaction.	Dilution.	Time of observation.	Day of Disease.	Organism.	Blood in stools.	Mucus in stools.	Number of stools in 24 hours.	Bacteriolog. Diag.	Serum given.	Result.	Remarks.
123	Marasmus. Dysenteria infantum.	+	1–1000	1	3	M[1]	+	+	3–8	+[2]	++[3] +	Died.	Died at home, 3 days after discharge. Fly-borne infection?
132	Dysenteria infantum.	+	1–1000	5	28	H[3]	+	+	6–14	+	+	Died.	
136	Dysenteria infantum. Eclampsia.	+	1–50	3	9	H	+	+	11–16	+	0	Died.	Pus in stools. Blood taken at autopsy.
137	Dysenteria infantum.	+	1–1000	1	17	H	0	+	6–12	+	+	Impr.	Taken home early.
140	Dyspeptic diarrhœa.	0		1.3	17	M & H	0	+	3–12	0	0	Well.	Child convalescent when blood taken.
142	Diarrhœa, simple. Adenitis cervical, tuberculous.	0		3	9	H	0	S[5]	8–11	—[4]	0	Well.	Intermittent simple diarrhœa.
143	Ileo colitis. Dysenteria infantum.	+	1–1000	1	16	H	++	+	7–17	+	0	Well.	Pus in large amount. Positive 31st day also, 1–100.
146	Dysenteria infantum.	+	1–20	1	17	H	0	+	7–10	+	0	Well.	Convalescent when blood taken.
147	Dyspeptic diarrhœa.	+	1–50	1	17	M	0	+	3–7	0	0	Well.	Blood not tried higher. Relapsed.
151	Dysenteria infantum.	+	1–50	1	9	M	+	+	3–7	+	0	Well.	Not tried higher. History blood in stools, slight.
151A	Dysenteria infantum.	+	1–100	3	16	H	+	+	3–12	+	0	Impr.	History blood in stools. None here. Not tried higher. Relapsed.
152	Dyspeptic diarrhœa.	+	1–1000	1	5	M	S	+	4–8	—	0	Impr.	History of 20-30 stools. Relapsed. Vide 237. H+ 1–20 only.
153	Dysenteria infantum.	0		3	10	M	S	+	3–8	+	0	Well.	Suggestive 1–50.
160	Ileo colitis. Dysenteria infantum.	0		3	22	M	+	+	4–19	+	+	Impr.	Pus in stools.
161	Marasmus.	+	1–20	1	20	H	0	+	3–10	—	0	Died.	Negative higher.
162	Dyspeptic diarrhœa.	0		3	15	M	0	+	4–7	0	0	Well.	See No. 285. Relapsed.
163	Dyspeptic diarrhœa.	0		3	15	H & M	+	+	6–8	0	+	Well.	No blood in stools while here.
165	Dyspeptic diarrhœa.	0		3	17	H	+	+	4–8	—	0	Well.	No blood while here. One of twins, other malnutrition.
166	Malnutrition. Dyspeptic diarrhœa.	0		3	15	H	0	+	3–4	0	0	Well.	Negative also later in summer.
167	Dyspeptic diarrhœa.	0		3	10 & 21	H	0	S	6–10	—	0	Well.	
169	Malnutrition. Dysenteria infantum.	0		3	29	H	0	+	3–18	+	0	Well.	Child one of twins, other died at home previously of "summer complaint." See 283. Relapsed.
178	Dyspeptic diarrhœa.	0		3	26	M	0	+	3–7	0	0	Disch. well.	Died at home later.
179	Malnutrition.	0		3	21	H	0	S	3–6	—	0	Died.	Suggestive 1–100
180	Dyspeptic diarrhœa.	0		3	24	H	S	S	3–12	0	0	Well.	History of slight blood, none here. Suggestive 1–20.
183	Dyspeptic diarrhœa.	0		3	24	H	0	+	8–11	0	0	Well.	History 15–20 stools.
185	Ileo colitis. Dysenteria infantum.	00		3	33.61	H.M	+	+	4–12	+	0	Well.	Suggestive 1–100. Pt. convalescent. History 16–24 stools.
187	Dyspeptic diarrhœa.	0+	1–1000	3	8.29	H.M	0	+	3–6	0	0	Well.	Suggestive 1 hr. 1–250
188	Dyspeptic diarrhœa.	0		3	8.29	H.M	0	+	4–11	0	0	Well.	Twin of 187. Suggestive 8th day.
189	Malnutrition. Dysenteria infantum chronica.	+	1–100	3		H	0	0	2–5	—	0	Well.	Acute history of attack in April with isolation of organism. See text.
190	Malaise. Dysenteria infantum chronica.	+	1–250	3		H	0	0	2	—	0	Well.	Acute history of attack in April with isolation of organism. See text.
191	Malnutrition.	0		3	13	H	0	+	2–5	—	0	Well.	
194	Malnutrition. Dyspeptic diarrhœa.	0		3	5	H	0	S	6–10	—	+	Died.	Twin sister of 195.
195	Dysenteria infantum.	0		3	4	H	0	S	4–11	+	+	Impr.	
198	Dyspeptic diarrhœa.	0		3	7	H	0	S	2–5	—	+	Well.	Strongly suggestive 1–100.
200	Dyspeptic diarrhœa.	+	1–1000	1	8	M	+	+	2–8	0	0	Well.	History of very frequent stools.

TABLE I.—*Continued.*

Clinical Number	Clinical diagnosis.	Reaction.	Dilution.	Time of observation.	Day of disease.	Organism.	Blood in stools.	Mucus in stools.	Number of stools in 24 hours.	Bacteriolog. Diag.	Serum given.	Result.	Remarks.
201	Dyspeptic diarrhœa.	0		3	7	H	0	0	2	—	0	Well.	History of 17 stools.
203	Dyspeptic diarrhœa.	0		3	21	H	0	+	2	—	0	Well.	History 6–7 stools. Clinically negative.
204	Dyspeptic diarrhœa.	0		3	3	H	0	+	3–7	0	+	Well.	
209	Dyspeptic diarrhœa.	0		3	11	H	0	+	3–5	—	0	Well.	
210	Ileo colitis. Dysenteria infantum.	0		3	7	H	0	+	3–8	+	+	Died.	
212	Dyspeptic diarrhœa.	0		3	35	M	+	+	4–8	—	0	Well.	Child well when blood taken, day of discharge.
213	Dyspeptic diarrhœa.	0		3	25	M	0	+	4–11	—	0	Well.	Relapsed. See 327.
215	Dyspeptic diarrhœa.	0		3	11	H	0	S	2–4	—	0	Impr.	Died at home.
219	Dyspeptic diarrhœa.	+	1–1500	3	23	M	+	S	3–6	0	0	Well.	History only, of blood. Relapsed. See 287. Suggestive 1–250, 1 hr.
220	Dyspeptic diarrhœa.	00		3	18.25	M	0	+	3–9	0	0	Well.	
221	Ileo colitis. Dysenteria infantum.	0		5	21	H	+	+	4–16	+	+ +	Died.	History of 20 stools. Strongly suggestive 1–100.
222	Dysenteria infantum.	0		3	7	H	0	+	2–6	+	+	Well.	History 10–12 stools. Relapsed.
223	Ileo colitis. Dysenteria infantum.	0		3	26	H	+	+	4–12	+	+ + + +	Died.	Suggestive 1–50.
224	Dyspeptic diarrhœa.	0		3	12	M	0	+	3–5	—	0	Impr.	Convalescent when tested, day of discharge.
228	Dyspeptic diarrhœa.	+	1–500	1	17	M	0	+	2–5	0	0	Well.	
230	Dyspeptic diarrhœa.	+	1–100	3	23	H	+	+	3–8	—	0	Well.	History of blood once. None noted here.
232	Diarrhœa, simple.	0		3		H	0	S	2–3	—	0	Well.	
235	Dyspeptic diarrhœa.	0		3	22	M	0	+	2–5	—	0	Well.	
237	Dyspeptic diarrhœa, relapse.	0		3	17	M	0	+	3–6	—	0	Well.	Child well when blood taken. Relapse. See 159.
239	Dyspeptic diarrhœa.	0		3	19	M	S	+	4–10	0	0	Well.	History of blood once, slight.
240	Dyspeptic diarrhœa, relapse.	+	1–1000	1	18	M	0	+	3–5	—	0	Well.	Relapse. Blood not tried 1st admission.
241	Dyspeptic diarrhœa.	0		3	9	H	+	+	3–7	—	0	Impr.	Take home early.
243	Malnutrition. Colitis. Bronchopneumonia. Dysenteria infantum.	+	1–1000	3	25	M	+	+	3–8	+	0	Died.	Blood positive 1–250 in 1 hour.
244	Dyspeptic diarrhœa, relapse.	0		3	3	H	0	+	4–16	0	+	Well.	Readmission, No. 148. 3d day relapse.
255	Diarrhœa, simple.	0		3	14	M	0	+	2–4	—	0	Well.	
258	Dysenteria infantum.	+	1–100	1	7	M	0	+	5	+	0	Impr.	Taken home early.
259	Ileo colitis. Dysenteria infantum.	+	1–100	5	30	M	+	+	5–13	+	0	Well.	Negative 3d day, strongly suggestive 1–1000. Probably positive higher than 1–500, but overgrown. Pus in stools.
260	Malnutrition.	0		3	23	M	0	+	2–4	—	0	Well.	Suggestive 1–100.
261	Dysenteria infantum. Suppression of urine.	+	1–1000	1	16	M	+	+	9	+	+	Died.	
263	Dysenteria infantum.	+	1–500	3	40	M	0	+	5–9	+	0	Well.	Taken home early. History 15–20 stools. S. 1–100, 1 hr., S. 1–1500, 3 hr.
264	Dyspeptic diarrhœa.	0		3	28	M	0	+	5–11	—	0	Well.	S. 1–100, 1 hr. Lived in same house with No. 265.
265	Dyspeptic diarrhœa.	0		3	25	M	0	+	4–10	—	0	Well.	History of onset with 35 stools per day.
271	Malnutrition. Dysenteria infantum. Intestinal obstruction.	+	1–1000	1	2	M	0	+	3–8	+	+	Died.	
272	Ileo colitis. Dysenteria infantum. Furunculosis. Glossitis.	+	1–100	1	14	M	+	+	4–12	+	+ + + + +	Unimpr.	Taken home. Died next day.
274	Dysenteria infantum.	+	1–100	3	14	M	0	+	4–8	+	+ + +	Impr.	History 15–20 stools. Taken home. Died.
277	Dyspeptic diarrhœa.	+	1–500	3	39	M	0	S	3–5	—	0	Well.	

TABLE I.—*Continued.*

Clinical Number.	Clinical diagnosis.	Reaction.	Dilution.	Time of observation.	Day of disease.	Organism.	Blood in stools.	Mucus in stools.	Number of stools in 24 hours.	Bacteriolog. Diag.	Serum given.	Result.	Remarks.
278	Malnutrition. Colitis. Dysenteria infantum.	+	1-100	1	14	M	0	+	12	+	++	Died.	History of pus in stools. Suggestive 1-1000, 1 hr. Died day after admission. Probably positive higher.
280	Malnutrition.	+	1-100	3	20	M	0	S	4-5	—	0	Well.	Suggestive 1-500, 1 hr.
281	Dysenteria infantum	0		3	14	M	+	+	3-5	+	0	Well.	History 10-15 stools.
283	Dyspeptic diarrhœa.	+	1-100	3	8	M	0	+	3-8	—	+	Well.	Suggestive 1-250, 3 hrs. Readmission No. 169.
285	Ileo colitis. Dysenteria infantum.	+	1-1000	3	see text 67	M	+	+	4-17	+	+	Died.	Relapse No. 162.
286	Malnutrition.	0		3	36	M	S	+	7-37	0	++	Impr.	
287	Ileo colitis. Dysenteria infantum.	Blood not tried this admission. See text.					+	+	4-15	+	++ ++	Died.	Blood not taken through oversight. Relapse. See No. 319.
295	Dysenteria infantum.	+	1-100	3	2½ mos.	M	S	+	3-9	+	0	Well.	S. 1-500, 3 hrs. History 10-12 stools.
299	Dysenteria infantum	0		3	26	M	+	+	5-11	+	0	Impr.	Taken home early. Died at home.
301	Malnutrition. Colitis. Dysenteria infantum.	0		3	22	M	+	+	4-7	+	++	Died.	
310	Dyspeptic diarrhœa.	+	1-500	3	16	M	+	+	2-11	—	0	Impr.	History of bloody stools, 10-15 per day. S. 1-1000.
317	Dysenteria infantum.	+	1-1000	1	R. 14	M	+	+	9	+	+	Died.	Relapse. Resembled cholera infantum.
318	Marasmus. Dyspeptic diarrhœa.	+	1-1000	3	24	M	+	+	3-9	—	0	Impr.	Not observed 1 hr.
322	Pyelitis. Malnutrition.	0		3	28	M	0	+	1-5	—	0	Unimpr.	
327	Dysenteria infantum.	+	1-100	3	R. 26	M	0	+	7-17	+	0	Impr.	Accident to high dilutions. Pus in stools. Relapsed. Case No. 213.
328	Rachitis. Dysenteria infantum.	+	1-250	1	19	M	0	+	4-14	+	+	Well.	S. 1-500, 3 hrs. Relapse, No. 316.
330	Ileo colitis. Malnutrition. Dysenteria infantum.	+	1-1000	3	16	M	+	+	5-10	+	+	Died.	Not observed 1 hr.
331	Malnutrition. Rachitis. Dyspeptic diarrhœa.	+	1-1000	3	2 mos.	M	S	+	5-8	0	0	Unimpr.	+ 1-50, 1 hr. Intermittent diarrhœa. S. 1-1000, 1 hr.
332	Dyspeptic diarrhœa.	+	1-1000	3	15	M	0	S	5-11	—	0	Well.	S. 1-250, 1 hr.
333	Ileo colitis. Eclampsia. Dysenteria infantum.	+	1-0000	3	15	M	+	+	17.29 44.	+	++	Died.	Cholera infantum type. Pus in stools. + 1-250, 1 hr.
335	Ileo colitis. Eclampsia. Dysenteria infantum.	+	1-1000	3	10	M	+	+	9-13	+	+	Died.	Muco-pus in + stools. + 1-200, 1 hr.
338	Dysenteria infantum.	+	1-200	3	15	M	+	+	5-9	+	+	Impr.	No blood in stools at Sanitarium. History 10-14 stools.
339	Dysenteria infantum.	+	1-100	1	33	M	0	S	4-7	+	0	Impr.	Taken home. S. 1-350 1 hr. History 8-10 stools.
342	Dyspeptic diarrhœa (convalescent).	+	1-500	3	16	M	0	+	2-5	—	0	Well.	S. 1-1000, 3 hrs.
343	Malnutrition.	+	1-1000	4	28	M	0	+	5-10	0	0	Impr.	
348	Rachitis. Stomatitis. Dyspeptic diarrhœa.	0		3		M	+	+	3-6	—	0	Well.	Sick "off and on". Worse for 3 days.
349	Malnutrition.	+	1-1000	3		M	0	+	6-9	—	0	Impr.	History of intermittent diarrhœa. Died at home.
381	Dyspeptic diarrhœa.	+	1-1000	4	42	M	+	+	6-10	—	0	Impr.	History of blood once only.
383	Dyspeptic diarrhœa (Reinfection.	0		4	7	M	+	+	3-7	—	+	Impr.	History 5-13 stools.

[1] "Mortenson" cultures.

[2] Each + stands for 50 cc. serum or fraction thereof.

[3] "Harris" culture.

[4] — = not examined.

[5] S = slight amount.

"Time of observation" is given in hours. "S" in "remarks" = suggestive. "Taken home" refers to cases taken home by parents against advice, usually early. Day of disease reckoned approximately, i. e., "Child sick about 3 weeks" = 21 days. "Number of stools" gives upper and lower limit of number during attack, before convalescence.

[6] All organisms isolated from stools were of the type producing acid in mannite litmus agar. No alkaline forms were observed.

one reacted 1-20 in convalescence (146). Of the remaining seven cases, one was of only nine days duration, and blood at autopsy reacted 1-50. Of the remaining six cases (15 per cent) only one was over 25 days duration. Of the forty-two cases with a diagnosis of dyspeptic diarrhœa or ileocolitis, fourteen gave a positive reaction; but as no bacteriological examination was made of the stools in very many of the negative cases, there is no certainty that they were all due to infection with *B. dysenteriæ*, though a fairly large number of them were undoubted dysentery cases, blood in stools, etc. Many of them were early cases, and some were positive in low dilutions or suggestive even higher. Whether or not repeated examination of the blood might have changed the result, cannot of course be stated. Of the five cases of malnutrition and marasmus giving a positive agglutination reaction, two (189 and 190) had dysentery in the spring (see below), one had a history of intermittent diarrhœa lasting two or three months, and one had a marked mucus diarrhœa on entrance (343). Of the negative cases, one was positive 1-20 (161), and one was suggestive 1-100 (179).

As regards day of disease upon which a positive reaction was obtained, the earliest was 271 which reacted in a dilution of 1-1000 on the second day, and the next earliest was 123 which gave a reaction in the same dilution on the third day. Other early cases were: 152, 5th day; 258, 7th day; 200, 8th day; and 136, 9th day. Other early cases, but all giving negative reactions, were 194, 195, 198, 201, 204, 210, 222, 241, 244 (3d day of relapse), and 383. With the exception of 201, and 241 who was taken home the next day, all these cases were injected with antidysenteric serum, and hence it was impossible to try their blood reactions later without this new factor being considered. Such cases were not tried again. Many cases however, as late as the twenty-fifth or thirtieth day gave a negative reaction (169, 178, 213, 220, 223, 264, 265, 299), though in two instances (169, 213), such cases later gave a positive reaction when returned with a relapse (283 and 327). No. 162 was negative on June 25, 15th day of disease, but having been sick at home nearly all the time since discharge, returned to the Sanitarium and on July 24, gave a positive reaction 1-1000, and again on August 17 (67th day).

The persistence of the reaction was found to be variable. No. 152 was positive 1-1000 on June 23, 5th day of attack, but when well on July 24, after a relapse, 31st day of disease, her blood was quite negative. No. 146 when convalescent only gave a positive reaction 1-20 on the seventeenth day of disease; here, unfortunately, no earlier examination had been made. No. 212, when well on the thirty-fifth day of a rather sharp attack gave a negative reaction; here, too, no earlier examination had been made. No. 260 was positive 1-500 on the fortieth day while still very sick. No. 277 was positive 1-500 on the thirty-ninth day. No. 331, a child previously fed on condensed milk, and the subject of marked rickets and malnutrition, had been ill off and on for two months or more with mucous diarrhœa, and with a trace of blood in the stools on one or two occasions; he gave a positive reaction 1-1000 in three hours, suggestive 1-1000 in one hour, positive 1-50 in one hour. Here the specific organism was very carefully searched for, but not found. No. 339 was positive 1-100 on thirty-third day. No. 143, positive 1-1000 in one hour on sixteenth day, still gave a positive reaction when discharged on the thirty-first day. Nos. 189 and 190 are especially interesting cases. In April, three months before, they both had an attack of bloody diarrhœa, following a similar case in an adult in their family. *B. Dysenteriæ* was isolated from both children by Dr. Bassett,[1] and their blood reacted positively. They were admitted to the Sanitarium with malaise and malnutrition, but had no diarrhœa; they had had no diarrhœa since April, though in each case blood examination was still positive, 1-100 and 1-250 respectively.

TABLE III.

	Day of disease.															Total
	2	3	4	5	6	7	8	9	10	10-14	14-21	21-28	28-35	35-45	Over 45	
Positive reactions....	1	1	..	1	..	1	3	.	1	4	13	7	4	3	6	45
Negative reactions....	..	2	1	1	..	5	2	4	2	6	18	13	4	..	5	63
																108 *

*Some cases tested twice.

The dilutions tried were 1-20, 1-50, 1-100 in all cases; 1-250, 1-500, 1-1000 in most cases; and 1-1500 in a few cases. But one case of those tried 1-1500 reacted positively. Several reacted 1-1000 as is shown in Table IV.

TABLE IV.

REACTION DILUTIONS.

1-100	13 cases.
1-250	3 cases.
1-500	5 cases.
1-1000	22 cases.
1-1500	1 case.

Of the relationship of diagnosis and day of disease to height of reaction very little can be said, as there seems to be no constant relation in this regard, some mild cases giving positive reactions at high dilutions, and some severe cases giving positive or even negative reactions at low dilutions. The same may be said in regard to the relation between day of disease and the height of reaction. A more marked influence upon the height of reaction was exerted by the degree of seeding of the suspension of the organism; a light seeding reacting oftentimes higher than a heavy one. This is probably due to the amount of agglutinin in the blood serum being insufficient for a large number of organisms. However, a quicker reaction could often be obtained with a heavier seeding. Practically no work was done with a view of determining the relative reactive powers of the different strains of organisms, further than to observe that the culture "Mortenson," an acid type isolated from a case of dysenteria infantum in the summer of 1902, and recently passed through a guinea-pig gave more

[1] My thanks are due to Dr. Bassett for the facts just stated, and the results of the bacteriological examination of stools mentioned in Table I.

satisfactory results than the stock culture of the "Harris" strain isolated by Flexner in Manila. This culture, denoted "M" in the main table, was usually used in making the examination; when not used, a Harris culture was utilized, denoted "H." Our choice of an acid type of the organism for these tests was dependent upon the fact that all the bacilli isolated from the cases at the Sanitarium in 1902 and 1903, were of this type.

Of the 44 positive cases, 23 showed blood in the stools while under observation or gave a history of having had blood. All showed mucus, except 189 and 190 mentioned above, and a few showed pus. Of the 42 cases in the table with blood in the stools, 24 gave a positive reaction, and 18 a negative one, most of the negative cases being very early ones.

No controls with other organisms were made, but several controls with agglutinating serum (immune serum) were made, and in every case controls of the bouillon suspension of the organisms were made and followed with the serum mixture. The clumping was only in a few instances that of the agglutination of the typhoid bacillus, large compact clumps, the clumps usually being much smaller. The small clumps were either compact or loose, generally the former, but the large clumps were often quite loose, the "chain" or "skein" clumps (the end to end agglutination) being several times observed. Free organisms were scarce, absent in the low dilutions, and not frequent in the high ones. Though *B. dysenteriæ* has no true motility, yet the Brownian movements were usually very active, and these were much quieted by the agglutination, if not entirely inhibited. This is regarded as important, and oftentimes when the control suspension was somewhat clumped from overgrowth, or from poor suspension of the organism it was a very helpful, if not a diagnostic point, as active movements of the clumps or of the individual bacilli in them were always seen in the control.

With a few exceptions all reactions were observed at one hour and at three hours; a few were observed at four or five hour intervals. Of the positive cases, eighteen reacted at one hour (this does not show in table, as times there given are for reaction of the highest dilution), and twenty-six at three hours. Many times a positive reaction in low dilutions has been present in one hour, but not until three hours were the higher dilutions positive. Some high dilutions had to be disregarded at the second reading on account of overgrowth (four or five hour readings) and in such cases only the first reading is recorded.

REPEATED COPIOUS HÆMOPTYSIS FROM AN AORTIC ANEURISM, EXTENDING INTO THE RIGHT LUNG AND FINALLY RUPTURING INTO THE PLEURA.[1]

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The case I wish to report is that of J. McD., an Irishman, 39 years of age, who was admitted to the Lakeside Hospital, Medical Number 4303, in the service of Dr. Edward F. Cushing, on July 13, 1904, complaining of pain in the right upper chest, cough, and expectoration of blood. His father had died of consumption. Beyond this the family history was negative. The patient had always been a healthy, strong man, by occupation a laborer, and had done hard work all his life. He had rheumatism twelve years ago, and slight attacks of the same disease ever since then. As to specific history, the patient admitted having gonorrhœa three times, the last attack eight years before, and a soft chancre eighteen years ago. No history of a primary sore or secondary syphilitic lesions could be obtained. Except for the minor diseases of childhood, the patient had had no further illnesses. He used alcohol to excess.

The patient dated his present trouble from a year before admission to the Hospital, when he began to have discomfort in his chest, especially the right front, shortness of breath, dizziness, ringing in the ears, and attacks of weakness. His general condition grew worse until two weeks before admission to the Hospital, when he began to cough and expectorate small amounts of blood. At this time, the pain in the chest grew much more severe, and on admission it extended to the right shoulder and down the right arm to the elbow. On the day he came into the hospital, he had had an especially profuse hæmorrhage, but was quite indefinite as to the exact amount. During the past year, he had lost twenty pounds in weight.

On examination, the patient was found to be a well built, muscular man, coughing frequently and expectorating considerable quantities of blood-stained mucus. His voice was husky but not brazen, and the cough not the typical "goose cough." His respirations were normal, the pulse regular and of good volume, 88 per minute. The left pulse seemed slightly more full than the right. They were synchronous. The face was of good color; pupils equal and normal; slight arteriosclerosis. There was a very slight tracheal tug. On inspection of the chest, it was found to be symmetrical and the expansion equal. Over the first and second right inter-spaces, for a distance of 11 cm. from the mid-line and over the third inter-space for 4 cm., there was a marked visible pulsation,

[1] Read before the Clinical and Pathological section of the Cleveland Academy of Medicine, on Nov. 4, 1904.

but no bulging of the chest. On palpation over the pulsating area a slight systolic impulse could be felt, followed by a marked diastolic impact. There was no thrill. On percussion, dullness was obtained in this region over an area of 11.5 cm. laterally, and 9 cm. vertically downward from the right clavicle. The dullness did not extend to the left of the sternum. In the right back, the dullness extended from a point 3 cm. above the angle of the scapula upward for 8 cm., and included the entire space between the spinal column and the scapula. No pulsation or tumor was noted in the back. On auscultation over the right upper chest could be heard a markedly accentuated diastolic shock, and a loud friction rub, synchronous with the respiration. No bruit was audible. The lungs were elsewhere normal.

The apex of the heart was slightly more to the left than normal, in the fifth interspace 10.5 cm. from the mid-line, and the cardiac dullness 13.5 cm. out, or 4 cm. outside of the nipple. Except for a marked increase in the intensity of the aortic second sound, the heart sounds were normal. The physical examination was otherwise negative.

The unquestioned diagnosis of aneurism of the thoracic aorta was made, and the attempt made to put the patient on a modified Tufnell treatment. He, however, objected so seriously to the dry diet, and so absolutely refused to remain quiet, that this had to be given up. For ten days everything went well. After the second day, the bleeding stopped, and the cough and pain were greatly relieved. On July 23, however, after a sudden movement, the patient commenced coughing, and spat up four ounces of almost pure red blood. This was the beginning of a remarkable series of sixteen hæmorrhages. The next was on July 29, 8 ounces, and from then they occurred as follows: August 2, 12 ounces; August 6, 32 ounces; August 9, 16 ounces; August 11, 36 ounces; August 17, 16 ounces; August 20, 6 ounces; August 21, 20 ounces; August 24, 28 ounces; August 28, 10 ounces; September 2, 4 ounces; September 3, 2 ounces; September 5, 16 ounces; September 13, 8 ounces; and September 14, 7 ounces; in a period of seven and a half weeks a total of 225 ounces or slightly over 14 pints. This was almost pure blood, mixed with very little mucus. The hæmorrhages in each case, coming on after some exertion, as sitting up, or reaching for an article on the floor, lasted only a very few minutes, and accompanied paroxysms of coughing. At no time did he raise any fibrin or blood-clot. The hæmorrhages were in each case stopped by morphia, at times as much as a grain being required. The patient became steadily more pale. The red blood count dropped from 4,864,000 to 2,304,000 and the hæmoglobin from 65 per cent to 38 per cent in the first month after which, owing to an accident to the hæmoglobinometer, no record could be taken, but from the patient's appearance, it must have been much below this. Two days after the last hæmorrhage on September 15, 1904, the patient during a fit of anger, suddenly sat up in bed, became very weak, broke out into a cold sweat, and said he was dying. The pulse rose from 80 to 125 but remained fairly strong. The respirations became labored and finally stopped, the heart continuing to beat for some time after this. The patient died in about twenty minutes. During the last few days of the patient's life, signs of fluid were evident in his right chest, causing flatness at the base. The probable size of the aneurism and the danger of puncturing it made it seem inadvisable to use the exploring needle. Several attempts were made to examine the patient's larynx, but no good view could at any time be obtained.

During the illness, it was a matter of much speculation among the attending physicians why an aneurism, with a perforation large enough to cause such repeated large hæmorrhages, should stop bleeding at all, and not cause an immediate lethal hæmorrhage. The explanation of this is perhaps found in autopsy findings for the records of which, and for aid in summarizing the same, I wish to thank Dr. William T. Howard, Visiting Pathologist, and Drs. D. H. Dolley and J. H. Bacon, Resident Pathologists of the Lakeside Hospital.

AUTOPSY REPORT.

The following abstract is taken from the autopsy protocol:

Autopsy by Dr. David H. Dolley, September 16, 1904, aut. No. 536. The body is that of an adult male, 170 cm. long. Rigor mortis marked. Pupils equal and dilated. The chest is flat, the supra- and infra-clavicular fossæ well marked. There is no bulging or other abnormality of the thorax. The abdomen is scaphoid. The extremities are free from wounds, scars, and deformities. The superficial glands are not palpable.

Thorax.—The sternum, ribs, and costal cartilages are normal. The left lung over-laps the heart to more than the usual degree. The upper lobe of the right lung is the seat of a rather firm mass. The middle and lower lobes are not visible. The right pleural cavity contains 3000 cc. of dark blood-tinged fluid containing flakes of fibrin. The right parietal pleura is smooth and free from adhesions. The left pleural cavity contains a small amount of clear fluid. The pleura is smooth and free from adhesions. The thoracic contents were removed en masse.

Heart.—The pericardial cavity contains 200 cc. of clear fluid. The parietal layer of pericardium is somewhat thickened, as is the visceral layer over the right ventricle. At the latter point, the epicardium is red and rough. The pericardium is adherent to the upper lobe of the right lung, over the surface of which it extends for a considerable distance. The heart muscle on section is pale and flabby. The segments of the mitral valve are moderately thickened. The segments of the aortic valve are normal in appearance and show no thickening. The tricuspid and pulmonary orifices are of normal size and appearance. The right auricle is markedly compressed by the aneurism to be mentioned later. All the valves are apparently competent.

The Aorta.—The aorta just above the valve measures 7.5 cm. in circumference, at the junction of the ascending and transverse portions of the aorta, 8 cm. Below this, the vessel is not dilated. The aorta throughout is the seat of a number of large and small irregular thickened areas, which project slightly into the lumen. Some are calcified and rough. The

large branches of the aorta are normal. On the right side of the aorta, 3 cm. above the valve, there is an oval opening, 2.5 by 1 cm. in diameter, leading into a spherical sac, 9 cm. in diameter, which is filled with laminated fibrin, the superficial layers of which, are soft and of a grayish-red color, while the deeper layers are white and firm. The opening of the sac into the aorta is partly closed by a rather firm mass of grayish-white thrombus. This aneurismal sac, which is round in outline projects upward and somewhat backward, directly into the upper lobe of the right lung, which incases it throughout two-thirds of its extent. Anteriorly the sac is adherent to, and is covered, to a considerable extent, by somewhat thickened pericardium. The walls of the aneurism are comparatively thin, being thickest at the base, where they average 8 mm. and thinnest at the point just opposite the opening into the aorta, at which point the walls are lost in the lung tissue. Over a large part of its extent, the walls of the sac and the visceral pleura are continuous. Microscopically, the wall consists of firm fibrous tissue, organising fibrin and inflamed pleura, with occasional scattered traces of markedly compressed alveoli. At the point directly opposite the communication between the aorta and the aneurismal sac, there is an opening between the latter and the pleural cavity. At this point, the pleura is ruptured, and a rough mass of grayish-red fibrin projects into the pleural cavity. This opening is a linear tear, 5 cm. long. Adherent to the upper lobe of the lung, near this point, there is a fresh blood clot, weighing 700 grams. On transverse section through the sac and the right lobe, the whole interior of the sac is filled with, at some places firm, and at other places friable, clot. The aneurism occupies nearly the whole of the upper lobe of the right lung, and two-thirds of the extent of the aneurism is situated in this lobe. The bronchi leading to the upper lobe contain no blood, but on section, small bronchi can be traced into the aneurism sac. The lower and middle lobe of this lung are collapsed, airless and rather firm. The pulmonary arteries are normal throughout.

The Left Lung.—The left lung is voluminous and markedly emphysematous. On section, it is œdematous throughout. The bronchi of both lungs, the trachea, and larynx are normal in appearance.

Abdomen.—The abdominal muscle and subcutaneous tissue are normal. The diaphragm on the right side projects 4 cm. below the costal margin. The liver is displaced downward and to the left, and reaches a point 5 cm. below the umbilicus, the right lobe lying directly in the middle line. The stomach is displaced downward into the left iliac fossa. The ileum and jejunum and the transverse colon are displaced into the pelvis. The other abdominal organs are in their usual positions. The abdominal cavity contains a moderate amount of clear fluid. The peritoneum is smooth and free from adhesions. The liver is of ordinary size and shape. The biliary system is normal. The spleen, kidneys, pancreas, stomach, intestines, and other organs show no pathological changes.

Anatomical Diagnosis. Arterio-sclerosis of the aorta with sacular aneurism of the ascending arch of the aorta, projecting into and occupying a greater portion of the upper lobe of the right lung. Compression atelectasis of the right lung. Ruptured aneurism and extensive hæmorrhage into the right pleural cavity. General enteroptosis. Pressure upon the right auricle. Œdema and chronic passive congestion of both lungs. Hydro-thorax, hydro-pericardium, and hydro-peritoneum. Communications between aneurism and small bronchi.

RIGHT LUNG SHOWING ANEURISM.

U. L. = Upper Lobe and aneurism. M. L. = Middle Lobe. L. L. = Lower Lobe. A. C. = Aneurism Cavity opened. R. = Rupture. P. = Pericardium.

LITERATURE.

The point of especial interest raised by this case is that of non-lethal hæmorrhages in cases of thoracic aneurism. After looking up with some care, all the literature available in Cleveland, I have been compelled to conclude that such cases are very rare. Though cases have occurred, in which one or two severe hæmorrhages have been followed by months or even years of exemption, I have not found reference to any such series of large hæmorrhages as are here reported. With the facilities at my disposal, I have been unable to make a complete review of the literature, but have collected six cases showing one or more points of similarity to the present one.

In 1847, the case of the English surgeon, Mr. Liston was reported. This gentleman, after one profuse hæmorrhage, was absolutely well for three months. Then, after two months in which he steadily failed, and expectorated considerable rusty sputum, he died, without further hæmorrhage. At autopsy were found three old perforations into the trachea, blocked by blood clot. (1)

Gairdner, in 1859, reported a case in which the patient was ill ten years. Four years before he died, he had two profuse

hæmorrhages from his lungs, followed by some staining of the sputum. After this, he had no more hæmorrhages, though for the last six months, some staining, until a hæmorrhage of eight ounces caused suffocation and death. The autopsy revealed an aneurism of the descending aorta which had perforated the left bronchus and trachea, the perforation being filled with old clot. The left lung was collapsed but not involved. (2) Gairdner also states that up to that time, 1859, nine cases of thoracic aneurism had been reported which had had hæmorrhage two months or more before death. He gives no references except to the case of Mr. Liston, and I have been unable to find these cases.

Two cases are reported by Dr. Osler somewhat similar. The first, in which the patient had a hæmorrhage of two quarts and three weeks later slight hæmoptysis, Dr. Osler reports eight months later as a cured aneurism. (3) The second is a man, who, after one profuse hæmorrhage, lived four weeks, and then dropped dead without further bleeding. At autopsy, this case was very similar to the one here reported. It was an aneurism of the ascending arch, a large part of the wall of which was made up of pulmonary tissue, the trachea not being involved. In this case, as in the present one, death followed perforation of the aneurism into the right pleural sac, with internal hæmorrhage. (4)

Peacock reported in London still another case where the descending arch was involved, the aneurism wall being composed of the upper lobe of the left lung. This case spat up small amounts of blood for some time and finally died from rupture into the left pleura. (5)

Involvement of the lung in aneurism is a comparatively rare occurrence, but is one thing to be thought of in the consideration of pulmonary hæmorrhage, especially where there is a suspicion of thoracic aneurism. That an aneurism may cause extensive destruction of lung tissue without hæmorrhage is shown by Johnson's case. In this, the patient had symptoms of chronic pleurisy, and had no hæmorrhage until the fatal one. Aneurism was not suspected, but at autopsy one was found, of the descending aorta involving the lower left lobe of the lung, the aneurism walls being only one quarter of an inch thick, composed of fibrin, indurated lung and pleura. (6) This of course, must have existed for some time, but the bronchi were presumably compressed and obliterated in the wall of the sac.

From the above cases it would appear that, while hæmoptysis is a common fatal termination in thoracic aneurism, a very large hæmorrhage may occur in this disease, without causing the death of the patient, and that occasionally a patient may have one or more large hæmoptyses, and finally die from some other complication of the aneurism. The point of bleeding may be from rupture into the trachea or bronchi and be stopped by the opening being plugged with fibrin, or it may occur from involvement of the lung tissue itself. In the latter case, it is probable that the small bronchioles open into the wall of the sac, but are so compressed by it, that they normally remain closed, or are covered by fibrin. On exertion, or moving, either the fibrin shifts its position, or the straining of coughing opens the ends of the small bronchi and the blood leaks out. On the patient again becoming quiet, either naturally or by means of narcotics, the original condition is resumed and the bleeding is temporarily arrested.

In closing, I wish to express my thanks to Dr. William Osler of Baltimore, for some useful suggestions and for information concerning his cases, and to Dr. Edward F. Cushing of Cleveland for permission to report this case from his service at the Lakeside Hospital.

BIBLIOGRAPHY.

(1) Lancet, London, December, 1847, p. 633.
(2) Trans. Roy. Med. and Chir. Soc., London, 1859, p. 189.
(3) Phila. Med. Times, 1888, XIX, p. 149.
(4) Ibid., 1889, XIX, p. 223.
(5) Trans. Path. Soc., London, 1863, XIII, p. 39.
(6) Lancet, London, January 12, 1867, p. 44.

A CASE OF CÆSAREAN SECTION FOLLOWING VENTRAL FIXATION.

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In a recent number of the BULLETIN, Dr. Lynch published an analysis of a series of cases of Cæsarean section necessitated by ventral fixation of the uterus. To this the following case treated at the Hartford Hospital may be added.

J. I. (No. 36,541), white, aet. 39, was admitted May 3, 1904. She began to menstruate when she was fourteen and her periods had always been regular and the flow moderate in amount during the three days it generally lasted. She was married at twenty, but had no children. In July of 1901, she entered the Hartford Hospital with a history of painful defecation during the previous four or five years. A diagnosis of a malignant tumor pressing on the rectum had been made before her entrance, but on examination the trouble was found due to a retroverted uterus. This was fixed firmly to the anterior abdominal wall and her symptoms were relieved.

In the spring of 1903, she was married again. She became pregnant, her last sickness dating from July 15, 1903, and had a comfortable, normal pregnancy with no œdema, headache, or morning-sickness. She re-entered this Hospital, May 3, 1904. She had expected her confinement April 22. At the time of her entrance she was in no pain.

A physical examination showed a slender, rather poorly

nourished woman. Head, heart and lungs were negative. The abdomen was fairly symmetrically enlarged, the umbilicus was flat and the linea striæ were not numerous. The position of the child could not be made out by external palpation, the palpable parts being very confusing and the abdominal walls tense. The fœtal heart was heard 5 cm. above the navel in the median line. The cervix could not be reached per vaginam until a small hand was introduced when it was felt above the promontory of the sacrum and well back toward the spinal column.

Pelvic measurements: Between anterior-superior spines, 27 cm.; between iliac crests, 28 cm.; Baudelocque's diameter, 18 cm.

Upon May 4, the head of the child was thought to be in the left upper quadrant of the abdomen. With the patient under chloroform version was tried, one physician manipulating the fœtus externally and a second with his hand in the vagina. The child could not be turned. After the manipulations there was slight bleeding from the vagina which continued until she was delivered two days later. The night was passed comfortably, but during the night of May 5, she was very uncomfortable and restless though there were no typical labor pains.

May 6, at 1 p. m. the os was found dilated about 2.5 cm. and at 4 p. m. it was almost fully dilated. The patient had constant pain in back and groins. Late in the afternoon internal version was decided upon and attempted, but on introducing the hand into the uterus to grasp a foot a shelf of tissue was found on its anterior wall which much impeded any search for parts though the position of the head was recognized. Upon further examination the bowel was found prolapsed into the uterus. The diagnosis of a ruptured uterus led to her hasty transfer to the operating room.

On opening the abdomen the uterus was found ruptured in its very much thinned posterior wall and a dead, hydrocephalic fœtus was found lying half in the uterus and half in the peritoneal cavity. The uterus was amputated from the cervix, freed from its attachment to the anterior abdominal wall and removed together with its appendages. The peritoneum was sutured over the stump and the abdominal wall was closed in layers.

The patient was comfortable the next morning, but in the afternoon complained of pain in the abdomen and about 6 p. m. developed a maniacal excitement that necessitated restraint by a sheet. The mania was of extreme violence and once she caught her tongue between her teeth and bit it until it was cyanotic. This disturbed condition lasted until the morning of May 8, when she gradually regained her normal mental status and from that time made an uneventful recovery except for a slight stitch abscess and a profuse, purulent, vaginal discharge which, however, soon cleared up under bichloride douches.

The fundus of the uterus was found firmly fastened to the anterior abdominal wall by a broad area of adhesions which allowed no motion whatever. The anterior wall and fundus of the uterus were very much thickened and the anterior wall so sharply bent upon itself that its upper segment formed with its lower an acute angle which made the shelf of tissue felt per vaginam. The posterior wall was very much stretched and thinned out and was ruptured enough to allow part of the fœtus to prolapse into the abdominal cavity and bowels into the uterus. The rupture probably occurred at the time of the attempted external version.

A SURVEY OF OVARIOTOMY AT EXTREMES OF LIFE. REPORT OF A CASE IN A GIRL AGED 5.[1]

By Harry I. Wiel.

The occurrence in the service of Dr. Howard A. Kelly at the Johns Hopkins Hospital, of an ovariotomy in a girl 5 years old, has afforded the raison d'etre of a survey of the cases reported in literature suggesting not only a consideration of the subject in relation to the very young, but by way of contrast, also in the aged. It is not the purpose of this article to go into the pathological and clinical aspects of the subject in detail, as the writings of Hennig, Homans, Kelly, and Bland Sutton consider in full that side of the question. Here is meant rather to emphasize by statistics the frequency of occurrence of the various tumors of the ovary and the results of ovariotomy.

That all of us realize the plasticity of statistics, is true. The Germans put it very aptly when they say "Papier ist geduldig," and that note of warning should be sounded in the interpretation of these. We have taken the statistics as we found them, and when the percentage of recoveries is noted it must be borne in mind that many of the cases were reported solely because there was recovery, while it may be assumed that some cases with unfavorable issue are unrecorded. Furthermore, many of the reporters mean by recovery, merely immediate recovery, though death (as happened in some cases) occurred from metastasis of the tumor. These remarks apply more particularly to the cases in the young than those in the old, for the reason that the after histories of the latter have been followed more extensively, and that when death did occur, circumstances of age determined the cause to be something entirely foreign to the ovarian condition.

Under the term "extremes of life" we have arbitrarily fixed

[1] Presented before the Johns Hopkins Hospital Medical Society, December 19, 1904.

the limits of 10 years of age and under, and 70 years of age and over. The story of ovariotomy at these ages has been told before, and those who have told it have come to definite conclusions.

Garrigues speaks thus: "The age of the patient need not be taken into consideration; ovariotomy has been performed with success in young children and in old women over 80 years of age." Baginsky, though less enthusiastic, says: "Ovariotomies in young children are frequently performed, even with cures. Prognosis becomes better every day as technique of operations in this region progresses." Kelly expresses himself that "The age of the patient does not, as one would suppose, contribute any valid reason for refusing to operate. . . . On account of the large percentage of malignant tumors (in children) and the consequent dangers of delay the operation should be performed as soon as the patient can be suitably prepared for it. The best tonic relief is afforded by the removal of the growth." Even Hennig whose article appeared in 1878, recognized the advantage of early operation in children.

The story in old age does not differ. There seems to be a consensus of opinion among those who have had to deal with the matter, that the extreme age of the patient offers no contraindication whatever. Kelly and Sherwood came to the conclusion that the indications and contraindications in old age are the same as in general operations. They quote Skene Keith, whose emphasis and enthusiasm can best be appreciated in his personal communication, "We like old women to operate on; they always do well." Homans, who from his wide experience gave a large list of ovariotomies, was extremely impressed with the good result in this class of cases, and Bland Sutton, though pessimistic on many subjects, gives a list of 11 ovariotomies in women over 80, all recovering, a result truly remarkable.

It is Bland Sutton, however, who speaks unfavorably of ovariotomy in young children. In the cases he collected (these included 15 years of age and under), dermoids and cysts did well, but in operations for sarcomata of the ovary the results were disastrous. Of his 21 cases of ovarian sarcomata, 11 were dead one year after the operation, a percentage of 52.3 per cent.

Kelly expresses the state of affairs best, viz.: that operation on children under 4 years of age is attended by a mortality of more than one-half of the cases; but on the other hand the results obtained in the older children are remarkably favorable. One would think that the cause of this might be the increased frequency of malignant tumors in the younger years, and Dr. Kelly was of that opinion, but as will be seen by the tabulations below, such is not the case, the malignant tumors being hardly in higher percentage under 5 years of age than between 5 and 10 years.

Dr. Kelly's results were in some degree similar to those of Bland Sutton, and for the sake of comparison, their findings are here given in tabulated form.

	Cysts[2]		Dermoids		Solid Tumors	
	cases	mortality	cases	mortality	cases	mortality
Kelly	43.6%	7.2%	37.2%	21.2%	19%	33.3%
Sutton	41	7.3	38	13.1	21	52.3

These figures, as well as those to follow, are based only upon operated cases. There can be found in the literature, frequent mention of tumors of the ovary, in autopsy cases, and among these one can find instances occurring even in fœtal life. Von Franqué reports such a case. Olshausen reports an autopsy case of carcinoma of the ovary in a girl 8 years old, and another is reported by Amann, where merely an exploratory incision, and not an ovariotomy was done.

The youngest operated case is that of Chiene's, the patient being 3 months old. The result in this case is not known, as the after history is not reported. The child left the hospital however, with the wound healed. The oldest case is that of Thornton's, the patient being of the extreme age of 94. Here there was recovery. More remarkable, however, is the case cited by Owen. He operated on the patient in her 79th year for a parovarian cyst with successful result. In her 86th year she submitted to a second operation for an ovarian cyst of the same side. This was so successful that when seen 4 months after, the patient looked, to quote Owens, "as though she would live to be 100."

The Johns Hopkins Hospital has had some experience in cases of this character, and the results are gratifying. Six ovariotomies in women over 70 are on record, the mortality being nil. All of the tumors were cystic, 3 multilocular and 3 unilocular, 1 of the latter being carcinomatous. Of this number, 5 are reported by Dr. Kelly, the other by Dr. Schenck.

A statistical study of the cases on record here follows:

[2] Under the heading *cysts*, Sutton includes "cysts and adenomata." In the mortality of Sutton's cases of solid tumors, which were sarcomata, 4 of the cases counted here as deaths, recovered from the operation, but died later of metastasis.

CASES 5 YRS. OF AGE AND UNDER.

REPORTER.	AGE.	TUMOR.	RESULT.	REFERENCE.
Chiene	3 mos.	Cyst.	?	Edinburgh Med. Journal, June, 1884.
Power	4 mos.	Cyst.	Recovery.	Brit. Med. Journal, March 5, 1895.
Roemer	1⅝ yrs.	Teratoma.	Recovery.	Deutsche Med. Woch., Dec., 1883.
Harris	1⅝ "	Sarcoma.	Recovery.	American Journal of Obstetrics, Oct., 1904.
Péan	2 "	Dermoid.	Recovery.	Clin. Chir., 1887-8.
Busch-Olshausen	2 "	Dermoid.	Death.	Pitha-Bill.
Gibb	2½ "	Cystic Sarcoma.	?	Glasgow Med. Journal, ix, No. 1, p. 33.
Evers	2½ "	Sarcoma.	?	St. Louis Courier of Med., Aug., 1884.
Hooks	2½ "	Dermoid.	Death.	Amer. Jour. of Obstetrics, xix, 1022.
Neville	2¾ "	Dermoid.	Death.	Obstetrical Journal of Great Britain, viii.
Hoffman	2¾ "	Sarcoma.	Death.	Amer. Jour. of Obstetrics, xxxvi.

CASES 5 YRS. OF AGE AND UNDER.—*Continued.*

REPORTER.	AGE.	TUMOR.	RESULT.	REFERENCE.
Alcock	3 yrs.	Multilocular Cyst.	Death.	Lancet, 1871, vol. ii.
Cameron	3½ "	Sarcoma.	Death.	Glasgow Med. Journ., 1889.
Kalb	3⅝ "	Dermoid.	Death.	Medical Sentinel, March, 1897.
Boldt	4 "	Cyst.	Death.	Proc. Path. Soc. of N. Y., 1888.
Schwartz	4 "	Adeno-Cystoma.	Recovery.	Archiv für Gynec., xiii, 4.
Thornton	4 "	Dermoid.	Recovery.	Med.-Chir. Trans., viii, 4.
Foerster	4½ "	Sarcoma.	Death.	Amer. Jour. Obst., xxxi.
Byford	4⅝ "	Sarcoma.	Recovery.	Chicago Med. Record, 1891-2, ii.
Bangs	4¾ "	Multiloc. Cyst.	Recovery.	Amer. Gynec. and Obst. Journ., 1896.
Simons	4¾ "	Papillomatous Cyst.	Recovery.	Virginia Medical Semi-Monthly, Mar. 22, 1901.
Johnson	5 "	Cyst.	Recovery.	Lancet, 1897, i, p. 1093.
Syme	5 "	Cyst.	Recovery.	Australian Med. Journ., xv, 442.
Péan	5 "	Dermoid.	Recovery.	Clin. Chir., 1887-1888.

CASES 6-10 YRS. OF AGE.

Page	6 yrs.	Sarcoma.	Recovery.	Lancet, Dec., 1895.
Lucas	7 "	Mult. Cystoma.	Recovery.	Trans. Clin. Soc., London, xxi, 224.
McKee	7 "	Dermoid.	?	Univ. Med. Magazine, Phil., 1900.
Hamaker	7 "	Mult. Cystoma.	Recovery.	N. Y. Med. Jour., Sept., 1889.
Dandois	7 "	Dermoid.	Recovery.	"Pediatrics," Dec., 1896, p. 520.
Barker	7 "	Dermoid.	Recovery.	Phil. Med. Times., Nov., 1874.
Croom	7 "	Sarcoma.	Recovery.	Edinburgh Med. and Surg. Journal, 1893, p. 689.
Owens	7 "	Dermoid.	Recovery.	Sutton: Surg. Diseases of Fall. Tubes and Ovaries.
Thornton	7 "	Dermoid.	Recovery.	Brit. Med. Jour., 1881, vol. ii.
Chenoweth	7⅜ "	Mult. Cystoma.	Recovery.	Amer. Journ. Obstetrics, xv.
Cupples	7½ "	Dermoid.	Recovery.	Richmond and Louisville Med. and Surg. Jour., Dec., 1879.
Black	7½ "	Dermoid.	Recovery.	British Med. Jour., 1874, vol. i.
Stolypinsky	8 "	Carcinoma.	?	Revue de Gynecologie et de Chir. Abdom., viii, 708.
Dawson	8 "	Papillomatous Cyst.	Death.	Virginia Medical Semi-Monthly, March, 1901, p. 680.
Spencer Wells	8 "	Dermoid.	Recovery.	British Med. Jour., 1874, vol. i.
Omori and Ikeda	8 "	Dermoid.	Recovery.	Berl. Klin. Woch., 1890, No. 7.
Chenoweth	8 "	Sarcoma.	Recovery.	Amer. Jour. of Obstetrics, vol. xv.
Gussenbauer	8 "	Carcinoma.	Recovery.	Wiener Med. Wochenschrift, 1894, No. 47.
McKenzie	8½ "	Dermoid.	Recovery.	Dublin Jour. of Medical Science, 1888, lxxxvi.
Duchamp	8½ "	Cyst.	Recovery.	Arch. de Tocol., 1884, p. 23.
Parkes	9 "	Cyst.	Death.	Amer. Jour. of the Med. Sciences, 1890, p. 258.
Deletrez	9 "	Dermoid.	?	Annales de l'Inst. Chir. de Brux.
Routier	9 "	Dermoid.	Death.	Rev. Gén. de Clin. et de Ther., 1895.
Polotebnow	9 "	Dermoid.	Recovery.	Centralblatt f. Gyn., 1887, i.
Malins	9 "	Cysto-Sarcoma.	Death.	Lancet, 1890, i, 1174.
Forbes	9 "	Myxo-Sarcoma.	Recovery.	Australian Medical Journ., Melbourne, 1894, xvi.
Leopold	9 "	Carcinoma.	Death.	Centralblatt f. Gynekologie, 1894, xviii.
Péan	10 "	Mult. Cystoma.	Recovery.	Arch. de Toc. et de Gyn., 1893, p. 580.
Vincent	10 "	Cyst.	Recovery.	Lyon Méd., lxxiii.
Omori and Ikeda	10 "	Dermoid.	Recovery.	Central. f. Gyn., xvi.
McBurney	10 "	Sarcoma.	Recovery.	Ann. of Surgery, Phil., 1895, xxi, 706.
Wagner	10 "	Sarcoma.	Recovery.	Ann. f. Klin. Chir., xxx, 704.
Meigs	10 "	Cyst.	Recovery.	Boston Med. and Surg. Jour., cxii, p. 316.
Fenomenow	?	Sarcoma.	Death.	Rev. de Gyn. et de Chir. Abdominale, 1904, vol. viii, p. 708.
Karcewski	10 "	Dermoid.	Recovery.	Centralblatt f. Gyn., 1904, No. 17.
Baldy	10½ "	Papillomatous Cyst.	Recovery.	Amer. Gyn. and Obst. Journ., 1899, xiv, 184-186.

CASES 70 YRS. OF AGE AND OVER.

Homans	70 yrs.	Mult. Cyst.	Recovery.	Kelly and Sherwood, Johns Hop. Hosp. Reports, iii, 532.
Homans	70 "	Mult. Cyst.	Recovery.	Ibid.
Kaltenbach	70 "	Mult. Cyst.	Recovery.	Ibid., p. 530.
Keith (Skene)	70 "	Cyst.	Recovery.	British Med. Journ., 1887, i, 271.
Hall	70 "	Solid Tumor.	Recovery.	Cincinnati Lancet-Clinic, 1887, xix, 1-4.
Hennig	70 "	Mult. Cyst.	Recovery.	Inaugural Dissertation, Leipzig.
Homans	70 "	Mult. Cyst.	Recovery.	Kelly and Sherwood, Johns Hop. Hosp. Reports, iii, 528.
Eastman	70 "	Mult. Cyst.	Recovery.	Ibid., p. 524.
Edwards	70 "	Mult. Cyst.	Recovery.	Ibid.
Fehling	70 "	Mult. Cyst.	Recovery.	Ibid.
Freund	70 "	Cyst. (Cancerous?).	Death.	Records of Frauenklinik der Universität, Strassburg.
Frommel	70 "	Mult. Cyst.	Recovery.	Kelly and Sherwood, Johns Hop. Hosp. Reports, iii.
Davis	70 "	2 Colloid Tumors.	Death.	Ibid., p. 542.
Eastman	70 "	Mult. Cyst.	Recovery.	Ibid., p. 524.
Cluness	70 "	Cyst.	Death.	Trans. Med. Soc. of California, 1872-73, p. 48.
Croom	70 "	Mult. Cyst.	Death.	Trans. Edinburgh Obstetrical Society.
Croom	70 "	Parovarian Cyst.	Death.	"Analysis of 100 Cases of Abdominal Section," Edin. Med. Journ., May, 1889.
Bantock	70 "	"Tumor."	Recovery.	Brit. Gynec. Journ., May, 1892, p. 17.
Barnes	70 "	Cyst.	Recovery.	"Ovariotomy in Aged People," Provincial Med. Journ., Apr., 1888.
Van der Veer	70 "	Multiloc. Cyst.	Recovery.	Transactions of Med. Soc. State of New York, 1888; Annals of Surgery, May, 1888.

CASES 70 YRS. OF AGE AND OVER.—*Continued.*

REPORTER.	AGE.	TUMOR.	RESULT.	REFERENCE.
Wells	70 yrs.	"Tumor."	Recovery.	Kelly and Sherwood, Johns Hop. Hosp. Reports, vol. iii, p. 549.
Werth	70 "	Mult. Cyst.	Recovery.	Ibid.
Werth	70 "	Mult. Cyst.	Recovery.	Ibid.
Tait	70 "	Cyst. (both ovaries).	Recovery.	British Med. Journal, 1886, i, 923.
Thornton	70 "	"Tumor."	Recovery.	Med.-Chir. Trans., lxxi, 1887, 57.
Thornton	70 "	Carcinoma (both ovaries).	Death.	Ibid.
Sims	70 "	Cyst.	Recovery.	Kelly and Sherwood, Johns Hop. Hosp. Reports, vol. iii, p. 536.
Sims	70 "	Mult. Cyst.	Recovery.	Ibid.
Reamy	70 "	———	——	Ibid., p. 542.
Roberts	70 "	Mult. Cyst.	Recovery.	Medical Chronicle, Manchester, Oct., 1892.
Meredith	70 "	"Tumor."	Recovery.	"Report of 104 Ovariotomies," Med.-Chir. Transactions, lxxii, 50.
Morison	70 "	Mult. Cyst. (papillomatous).	Recovery.	Lancet, Jan. 21, 1893.
Löhlein	70 "	Fibroma.	Recovery.	Kelly and Sherwood, Johns Hop. Hosp. Reports, iii, 530.
Lomer	70 "	Mult. Cyst.	Recovery.	Ibid.
Martin	70 "	Mult. Cyst.	Death.	Ibid., p. 532.
Van der Veer	71 "	Mult. Cyst.	Recovery.	Kelly and Sherwood, Johns Hop. Hosp. Reports, vol. iii, p. 540.
Werth	71 "	Mult. Cyst.	Recovery.	Ibid.
Thornton	71 "	Papilloma (both ovaries).	Recovery.	Med.-Chir. Transactions, lxx, 1887, p. 64.
Savage	71 "	Mult. Cyst.	Recovery.	Records of Women's Hospital, Birmingham.
Schroeder	71 "	———	——	Berl. Klin. Woch., 1879, i, p. 2.
Sims	71 "	Dermoid.	Recovery.	Kelly and Sherwood, Johns Hop. Hosp. Reports, vol. iii, p. 536.
Peugnet	71 "	Cyst.	Recovery.	New York Med. Jour., xxiv, p. 191.
Martin	71 "	Cyst.	Recovery.	Kelly and Sherwood, Johns Hop. Hosp. Reports, iii, p. 536.
Kelly	71 "	Cyst.	Recovery.	Amer. Jour. of Obst., xxxiv, No. 2, 1896.
Homans	71 "	Sarcoma.	Death.	Kelly and Sherwood, Johns Hop. Hosp. Reports, iii, 532.
Bantock	71 "	"Tumor."	Recovery.	"On Hyperpyrexia after Listerian Ovariotomy," Med.-Chir. Trans., lxiv.
Wilson	72 "	Cyst.	Death.	Kelly and Sherwood, Johns Hop. Hosp. Reports, iii, 540.
Sims	72 "	Mult. Cyst.	Death.	Ibid., p. 536.
Rheinstädter	72 "	Cancerous Cyst.	Death.	Ibid.
Sänger	72½ "	Mult. Cyst.	Recovery.	Ibid.
Mundé	72 "	Mult. Cyst.	Recovery.	Ibid., p. 534.
Morison	72 "	Mult. Cyst. R. ovary. Fibroma, L. ovary.	Recovery.	Lancet, 1893, Jan. 21.
Martin	72 "	Mult. Cyst.	Recovery.	Kelly and Sherwood, Johns Hop. Hosp. Reports, iii, p. 532.
Kelly	72 "	Mult. Cyst.	Recovery.	Amer. Jour. Obst., xxxiv, No. 2.
Homans	72 "	Mult. Cyst.	Death.	Kelly and Sherwood, Johns Hop. Hosp. Reports, iii, p. 528.
Homans	72 "	Mult. Cyst.	Recovery.	"Laparotomies."
Gerster	72 "	Mult. Cyst.	Recovery.	Results of Aseptic and Antiseptic Surgery, 1st Edition, 1888, p. 141.
Frommel	72 "	Papillary Cyst.	Recovery.	Kelly and Sherwood, Johns Hop. Hosp. Reports, iii.
Cutler	72 "	Mult. Pap. Cyst.	Recovery.	Hospital Records, Waltham, Mass.
Barnes	72 "	Cyst.	Recovery.	British Gynec. Jour., Aug., 1892, p. 159.
Zweifel	73 "	———	Recovery.	Kelly and Sherwood, Johns Hop. Hosp. Reports, iii, p. 540.
Werth	73 "	Cyst.	Recovery.	Ibid.
Werth	73 "	Mult. Cyst.	Recovery.	Ibid.
Staude	73 "	Cyst. (both ovaries).	Recovery.	Ibid.
Söderbaum	73 "	Mult. Cyst.	Recovery.	Eira, Göteborg, 1882, vi, p. 69.
Maury	73¾ "	Cyst.	Recovery.	Mississippi Valley Medical Monthly, 1885, 5.
Kelly	73 "	Carcinomatous Cyst.	Recovery.	Kelly and Sherwood, Johns Hop. Hosp. Reports, iii.
Litzmann	73 "	Cyst.	Recovery.	Ibid.
Homans	73 "	Solid Tumor.	Recovery.	Ibid.
McCann	73 "	Fibroma.	Recovery.	Brit. Med. Journal, 1903, i, 127.
Keith	73 "	"Tumor."	Recovery.	Ibid., 1887, ii, 592.
Homans	73 "	Mult. Cyst.	Recovery.	"Laparotomies."
Homans	73 "	Cyst.	Recovery.	Ibid.
Homans	73 "	Mult. Cyst.	Death.	Ibid.
Crooker	73 "	Mult. Cyst.	Recovery.	Kelly and Sherwood, Johns Hop. Hosp. Reports, iii, p. 522.
Brennecke	73 "	Mult. Cyst.	Recovery.	Ibid., p. 520.
Balls-Headley	73 "	Dermoid.	Recovery.	Ibid.
Peterson	74 "	Cyst.	Recovery.	Ibid., p. 540.
Martin	74 "	Cyst.	Recovery.	Ibid., p. 532.
Spiegelberg	74 "	———	——	Olshausen, p. 394.
Noble	74 "	———	——	Monthly Homœopathic Review, London, 1903.
Morison	74 "	Mult. Cyst.	Recovery.	Lancet, Jan. 21, 1893.
Kelly	74 "	Mult. Cyst.	Recovery.	Amer. Jour. Obst., xxxiv, No. 2.
Kaltenbach	74 "	Parovarian Cyst.	Death.	Kelly and Sherwood, Johns Hop. Hosp. Reports, iii, 530.
Hoffmeier	74 "	Mult. Cyst.	Recovery.	Ibid.
Boldt	74 "	Mult. Cyst.	Recovery.	Ibid.
Croom	74 "	Cyst.	Recovery.	Trans. Edinburgh Obst. Society.
Carmichael	74 "	Mult. Cyst.	Recovery.	New England Med. Gazette, Apr., 1888, p. 119.
Martin	75 "	Tuberculosis.	Recovery.	Kelly and Sherwood, Johns Hop. Hosp. Reports, iii.
Kelly	75 "	Mult. Cyst.	Recovery.	Ibid.
Davies	75 "	Cyst.	Recovery.	Brit. Gynec. Journal, 1887, iii, 414.
Croom	75 "	Mult. Cyst.	Recovery.	Kelly and Sherwood, Johns Hop. Hosp. Reports, iii.
*Bennett, E. and C...	75 "	Mult. Cyst.	Recovery.	American Medical Times, N. Y., Aug., 1861, iii, 86.
Wilson	76 "	Papilloma.	Recovery.	Kelly and Sherwood, Johns Hop. Hosp. Reports, iii.
Josephson	76 "	Glandular Cyst.	Recovery.	Föhr-Svenska, 1889, Kelly and Sherwood.

* First case reported.

CASES 70 YRS. OF AGE AND OVER.—*Continued.*

REPORTER.	AGE.	TUMOR.	RESULT.	REFERENCE.
Holland	76 yrs.	Mult. Cyst.	Recovery.	Brit. Gynec. Jour., vii, 179.
Croom	76 "	Papilloma.	Recovery.	Records of Edinburgh Royal Inf.
Croom	76 "	Mult. Cyst.	Recovery.	Ibid.
Winkel	77 "	Cyst. R. ovary. Mult. Cyst. L. ovary.	Recovery.	Kelly and Sherwood, Johns Hop. Hosp. Reports, iii.
Wilcke	77 "	———	Recovery.	Olshausen, p. 394.
Wells	77 "	"Tumor."	Death.	Med.-Chir. Transactions, lx.
Terrier	77 "	Fibroma (both ovaries).	Recovery.	Progrès-Medical, 1888, p. 466.
Morison	77 "	Mult. Cyst.	Recovery (?).	Lancet, Jan. 21, 1893.
Mann	77 "	Mult. Cyst.	Recovery (?).	Med. Record, Sept. 1, 1883.
Lomer	77 "	Mult. Cyst.	Death.	Kelly and Sherwood, Johns Hop. Hosp. Reports, iii.
Samvrin	77 "	Cyst.	Recovery.	Amer. Journ. of Obst. and Diseases of Women and Children, Feb., 1884.
Borsini	77 "	Mult. Cyst.	Recovery.	Rev. Ital. di terap. ed. ig., Piacensia, 1881, i, 367.
Staude	78 "	Mult. Cyst.	Recovery.	Kelly and Sherwood, Johns Hopkins Hosp. Reports, iii.
Heywood Smith	78 "	Mult. Cyst.	Recovery.	Lancet, 1892, ii.
Freund	78 "	Parovarian Cyst.	Recovery.	"Ovariotomie bei Greisinnen" Inaugural Dissertation, Strassburg, 1890.
Keith	78 or 80 "	———	Recovery.	Kelly and Sherwood, Johns Hopkins Hosp. Reports, iii.
Tuttle	79½ "	Mult. Papill. Cyst.	Recovery.	Roosevelt Hosp. Records, N. Y., 1891.
Schroeder	79 "	———	Recovery.	Krankheiten d. Weibl. Geschl.
North	79 "	Cyst.	Recovery.	Brit. Med. Journ., 1903, ii, 1590.
Keith	79 "	———	Recovery.	Kelly and Sherwood, Johns Hopkins Hosp. Reports, iii.
Homans	79 "	Mult. Cyst.	Recovery.	Ibid.
Schroeder	80 "	———	Recovery.	Krankheiten d. Weibl. Geschl.
Richardson	80 "	Mult. Cyst.	Recovery.	Brit. Med. Journ., 1894.
Pippingsköld	80 "	Mult. Cyst.	Recovery.	Finska Läkare Handlinger, 1884, Helsingfors.
Owens	80 "	Parovarian Cyst.	Recovery.	Brit. Gynec. Journ., iv, 88.
Heywood Smith	81 "	Cyst.	Recovery.	Lancet, 1894, i, 1618.
Edis	81 "	Mult. Cyst.	Recovery.	Brit. Gynec. Journ., Aug., 1892, p. 162.
Cartledge	81 "	Mult. Cyst.	Recovery.	Trans. Southern Surg. & Gynec. Ass'n, x, 153.
Spencer	82 "	Mult. Cyst.	Recovery.	Brit. Med. Journ., 1893, ii, 1271.
Homans	82 "	Mult. Cyst.	Recovery.	Boston Med. & Surg. Jorn., 1888, cxvii, 454.
Remfrey	83 "	Cyst.	Recovery.	Trans. Obst. Soc., Lond., xxxvii, 152.
Kraft	84 "	———	Recovery.	Hospitalsridende, Copenhagen.
Bush	84 "	———	Recovery.	Kelly and Sherwood, Johns Hopkins Hosp. Reports, iii.
†Owens	87 "	Cyst.	Recovery.	Lancet, 1895, i, 542.
‡Thornton	94 "	———	Recovery.	Trans. Obst. Soc., Lond., xxxvii, 152.

† Second operation, first performed in 80th year.

‡ Oldest case.

TABLE I.

General Results.

70 YRS. AND OVER.		10 YRS. AND UNDER.
130	Total number of cases.	60
16 cases. 12.3%	Mortality.	14 cases. 22.4%
4 " 3.07%	Result not ascertained.	5 " 8.3%

TABLE II.

Results in the Various Tumors.

70 YRS. AND OVER. cases	% occurrence	mortal.		10 YRS. AND UNDER. cases.	% occur.	mortal.
2	1.5%	0. %	Dermoids	22	35.2%	22.7%
65	50. %	11. %	Mult. Cysts	6	9.6%	16.6%
1	0.7%	100. %	Sarcoma	14	22.4%	35.7%
24	18. %	8.7%	Uniloc. Cysts	13	20.8%	23. %
9	6.9%	0. %	Papillomatous	3	4.8%	33.3%
4	3. %	75. %	Carcinoma	3	4.8%	33.3%
4	3. %	0. %	Fibroma	..	..	..
4	3. %	50. %	Parovarian	..	..	..
1	0.7%	0. %	Tuberculosis	..	..	..
..	..	..	Teratoma	1	1.6%	0. %
22	16.5%	4.5%	Unclassified	..	..	..

TABLE III.

Cases 80 Years of Age and Over.

Number of cases	14
Nature of Tumor	as far as ascertainable, all benign cysts.
Mortality	0%.

TABLE IV.

Cases 5 Years of Age and Under.

Total number	24		
Deaths	8	Proportion of	33.3%
Results not given	2	" "	8.3%

TUMOR.	NUMBER OF CASES.	PROPORTION.	MORTALITY.
Dermoid	7	29.1%	65.1%
Sarcoma	7	29.1%	42.8%
Mult. Cyst	2	8.3%	50. %
Uniloc. Cyst	6	24.9%	16.6%
Papilloma	1	4.1%	0. %
Teratoma	1	4.1%	0. %

TABLE V.

Cases 5-10 Years of Age.

Total number of cases	36		
Mortality	6	Proportion of	16.3%
Results not given	3	" "	8.3%

TUMOR.	NUMBER OF CASES.	PROPORTION.	MORTALITY.
Dermoid	14	42.7%	7.8%
Sarcoma	8	24.4%	25. %
Cyst	6	16.3%	33.3%
Mult. Cyst	5	15.2%	0. %
Carcinoma	3	8.2%	33.3%
Papilloma	2	6.1%	50. %

TABLE VI.

CASES ARRANGED ACCORDING TO YEAR OF LIFE.

AGE.	NUMBER OF CASES.	AGE.	NUMBER OF CASES.
Under 1 year...	2	70	35
1 ...	2	71	11
2 ...	7	72	14
3 ...	3	73	17
4 ...	7	74	11
5 ...	3	75	5
6 ...	1	76	5
7 ...	12	77	9
8 ...	8	78	4
9 ...	7	79	5
10 ...	8	80	4
.. ...	..	81	3
.. ...	..	82	2
.. ...	..	83	1
.. ...	..	84	2
.. ...	..	87	1
.. ...	..	94	1

HISTORY OF THE CASE.

Elizabeth T., a girl aged 5, was admitted to the Johns Hopkins Genito-Urinary Dispensary on October 8, 1904.

Her *complaint* was that she was suffering from a vaginal discharge.

There was nothing of any importance in the family history, and except for two things her own past history was not interesting. The one was an attack of typhoid (?) in the first year of her life, and the other was a trauma, viz., a fall from a second-story window when she was 1½ years old.

The present illness on close questioning really dated from that fall. The child was apparently unhurt immediately after and went on with her playing as usual. Soon, however, she complained of *pain* which was so severe as to prevent sleep, and at times she would roll on the floor on her stomach trying to get relief. Her mother thought for a while that the child was shamming and acting as so many children do, for she could find nothing on feeling and looking at the child's abdomen which suggested to her anything wrong. This pain continued for a long time, about 1½ years, the mother thinks, and then subsided, except for occasional appearance. The next symptom was *swelling*, and this appeared only two months before visit to the dispensary. Following this there came *vaginal discharge*, for which the patient was brought here for relief.

On examination at the dispensary an offensive, white discharge was noted which the patient said was irritating. Other than some excoriation of the labia, there was no abnormality seen about the external genitalia.

Her second visit to the dispensary, on October 23, 1904, showed a change. The patient complained that the discharge which was formerly white had become pinkish, and the mother expressed some alarm. The genitalia were examined, and though no discharge was found there, in the garment there was every evidence of a bloody discharge. This led to further examination, and then there was found the tumor, which on the dispensary card is described as follows: "Above the pubic region there is a hard, rounded mass extending to the umbilicus, in shape, position as well as consistency resembling the uterus." Axillary and cervical glands were enlarged as well as the inguinal, and both mammæ were very large for a child of that age.

Having in mind the possibility of tumors in that region being distended bladder, Dr. Pollack and myself catheterized the patient but only 20 cc. of dark, clear straw-colored urine were obtained, and the tumor remained as before. Ether examination was not made then owing to lack of facilities for anæsthesia.

The patient was sent into the hospital where she was admitted on October 28, 1904. The results of examination there are these:

"Patient well nourished, no glands felt. *Chest* well formed. Breasts large for the age. Respiratory sounds well heard. A few fine râles in right axilla heard regularly at the end of inspiration, otherwise lungs clear. *Heart* P. M. I. in 4th interspace inside the mammary line. Sounds normal at apex and base. Pulse regular, 27 to ¼, of good volume.

"Hepatic dulness extends to costal margin. Edge of liver not felt. *Abdomen* looks rather full, especially just below the level of and at the side of the umbilicus. Appears symmetrical. On palpation the most prominent area of the abdomen is occupied by a more or less rounded, solid feeling mass, sharply circumscribed. Upper border of the tumor mass is about at the level of the umbilicus, but seems to pass a little higher up on the left side than on the right. Lower border crosses the median line about 2 fingers' breadths above the symphisis. More of the mass seems to be on the left side of the navel than on the right. Tumor the size of a large cocoanut, fairly freely movable and apparently not adherent to the pelvic organs of either side. Over the mass percussion is dull except along the left border where there is slight tympani. Neither kidneys nor spleen palpable. Pubic hairs well developed."

MEASUREMENTS OF ABDOMEN.

Girth at umbilicus	51.5	cm.
Greatest circumference	52.5	"
Distance from symphisis to umbilicus	13.5	"
" " umbilicus to xiphoid	13.5	"
" " " to right ant. sup. spine	10.5	"
" " " " left " " "	11.	"

Under chloroform anæsthesia, a combined vaginal and rectal examination showed a small uterus in anteflexion and that the mass was probably ovarian. A *diagnosis* of multilocular ovarian cyst was made by Dr. Kelly.

Before proceeding to tell of the operation and results, I should like to emphasize the sequence of the cardinal symptoms in this case. It is this:

Trauma, 3½ years before admission.

Pain, 3½ years before admission and not so severe recently.

Swelling, 2 months before admission.

White discharge, 3 to 4 weeks before admission.

Bloody discharge, 8 days before admission to hospital.

The *operation* performed by Dr. Kelly was a left Salpingo-oöphorectomy. A median incision was made and through this there was delivered a tumor of the left ovary about the size of a large cocoanut and freely movable. With it the left tube was removed, all of which was accompanied by no hæmorrhage. The right ovary which was seen, was small and apparently normal. The uterus was infantile, but rather larger than would be expected for 5 years. No evidence of metastasis of the tumor to the peritoneum or elsewhere. Catgut was alone employed, and the abdomen was closed in layers.

The patient stood the chloroform well and was removed to the ward in good condition, where she made an uneventful recovery and left the hospital, well, November 19.

Gross Appearance of the Tumor.—This tumor of the left ovary is ovoid in shape, and represents the whole organ tumified. It is 12.5 cm. long, 8.5 cm. broad, 7 cm. thick. Immediately after operation it had a somewhat boggy feel, something like that a soft solid tumor would give, but more suggesting a cyst with thick walls. It was mostly of a bluish-green tinge and shimmering, but in places could be seen beefy, brownish-looking areas showing through the glistening surface.

The tube is entirely attached to the tumor by a fold of peritoneum and this peritoneum extends along the tumor as far as ascertainable, about 5 cm., where it seems to affect a junction with a capsule about ¾ mm. thick. Radiating from the attachment of the tube are beefy-looking nodular yellowish-brown areas, extending all the way from 3 to 8 cm. On the surface these show a rich vascular supply.

Cutting the tumor in its long axis we find a capsule, ¾ mm. thick, from which extend bands of connective tissue which in some places more than others separate the underlying tissue into distinct alveoli, grayish in appearance and granular. The tissue underneath the capsule is found nothing other than the thick walls of a large cyst, the long axis of which corresponds with that of the tumified ovary. This wall varies from 2 to 4.5 cm. in thickness, and is for the most part alveoloid in arrangement, as heretofore described, though in some places there are more homogeneous white areas. The vascularity seems fair.

The large cyst is 7 cm. long, 4 cm. wide, 5 cm. through. It has a distinct lining membrane, thicker than the external capsule. This membrane is in some places perfectly smooth and arranged like a dome; in others it is thrown into rugæ and folds. The membrane is protruded in three distinct places by small underlying cysts, and at the external inferior angle of the cyst there protrudes a tumor 2 x 1 cm., apparently another cyst with a thick wall. Alongside of one of the cysts underneath the membrane of the large cyst, runs a good-sized vessel about ½ mm. in diameter.

In the walls of the large cyst, these walls making up most of the tumor, are 5 to 6 other cysts of less dimension, about 1.5 cm. in diameter, which contain a white gelatinous substance. Throughout the tumor are numerous small cysts of various sizes, each lined by a definite membrane.

Microscopic.—The diagnosis of adeno-carcinoma of the ovary was definitely made by Drs. Cullen and Hurdon. This was not done, however, until a very careful examination of many sections was undertaken. In some places the cellular arrangement of the new growth was highly suggestive of sarcoma and under a high magnification there was nothing to contraindicate that diagnosis. No alveolar arrangement was to be seen and the cells themselves were so aberrant as to suggest either the connective tissue or the epithelial tumor. At the advancing edges of the growth, however, a definite alveoloid and glandular arrangement was to be distinguished, and here the cells resembled much more suggestively the epithelial type.

Vascularity was good throughout and only in few places were there to be seen areas of slight degeneration and necrosis. Scattered throughout the sections were smaller cysts, the walls of which were plainly made out to be composed of many layered actively proliferating epithelium. Some of the cysts seemed to have as their content epithelial debris, others mucinous matter, and still others blood.

Trabeculæ of fibrous tissue were seen extending in from the capsule, but on the whole, stroma was present in not great proportion.

Gross Appearance of Longitudinal Section of the Tumefied Ovary with Adherent Tube.

This is the type of adeno-carcinoma of the ovary which Dr. Cullen describes as being extremely deceptive unless we examine many sections from various regions of the growth. It will usually be found, however, that at the advancing edges the carcinomatous arrangement will be quite typical and establish the diagnosis.

It is quite possible that some of the cases in literature diagnosed as sarcoma were rather tumors of this type.

As to the prognosis, it is certainly difficult to be of a definite frame of mind. Carcinoma occurs rarely in young children, at least in the ovary, and this is but the fourth case which has been operated on for removal of the growth. In the other three, Stolypinski's case is reported without giving the result, Gussenbauer's was well 6 months after the operation, and Leopold's died in 6 months from metastasis.

This tumor, though malignant, was extremely localized and even encapsulated. There were absolutely no signs of involvement of anything but the ovary and tube, and the operation was most successful in removing all of the morbid process. At the date of this writing, 3 months after the operation, the child is entirely well and active and shows no signs of any ailment.

From a consideration of the statistical study the following conclusions seemed justified:

First, and most important.—Age is no contraindication to operation in these cases.

Second.—Prognosis is extremely favorable in the aged, even in the most aged. In the young it is not so favorable, but nevertheless good.

Third.—Malignant ovarian tumors are rare in the aged but more common in the young, this greater frequency accounting for the greater mortality. The most frequent ovarian tumors in the aged are the benign cysts, particularly the multilocular variety, these tumors being comparatively rare in the young. Ovarian dermoids and sarcomata are the most frequent ovarian tumors in the young and the rarest in the aged.

In conclusion I must express my most sincere thanks to Dr. Kelly for the privilege of undertaking and reporting this work, and to Drs. Cullen, Hurdon and Holden for many points in pathology.

BIBLIOGRAPHY.

The bibliography here appended includes only references to general considerations of the subject. The bibliography of the cases is found in the tables.

Ashby and Wright: "Diseases of Children," p. 635.

Baginsky: "Lehrbuch der Kinderkrankheiten." p. 1037.

Bland Sutton: "Surgical Diseases of the Ovaries and Fallopian Tubes."

Bland Sutton: "Tumors, Innocent and Malignant."

Garrigues: "Diseases of Women."

Gebhard: "Path. Anat. Weib. Sex. Organe," p. 648.

Hennig: Gerhardt's Handbuch der Kinderkrankheiten.

Holt: "Diseases of Infancy and Childhood."

Homans: "Laparotomies."

Jacobson and Steward: "The Operations of Surgery," vol. ii, p. 527.

Kelly and Sherwood: Johns Hopkins Hospital Reports, vol. iii.

Kelly: Keating's Cyclopedia of Diseases of Children.

Kelly: "Operative Gynecology."

Von Franqué: Zeitschrift f. Gebürtsh. u. Gynäk., 1900, xliii, 257.

DISCUSSION.

DR. KELLY.—This subject is most interesting on account of the tender age of the patients. Enough attention has not been paid to the examination of children gynæcologically, for we find practically nothing relating to this important subject in the average text-book and but little in the literature.

It is so easy to use a little chloroform in the child and the danger is so much less in children than with adults that we ought to make more frequent use of anæsthesia in examining them.

An important point is the relatively greater length of the examining finger. If the child's pelvis is half the size of the adult's, the finger is then twice as long in proportion. It reaches further into the abdomen and we can examine a much wider territory.

Another important point in the vaginal examination of children is that instead of using the finger, which produces trauma and is painful and always repulsive, you can use a little cylindrical speculum, from 10 to 15 mm. in diameter; put the child in the knee-chest position and place a pledget of cotton saturated with 10 per cent cocaine within the hymen and then after about 7 minutes introduce the speculum, and with the head-light you can investigate all parts of the vagina, which is distended, and the cervix, and you can at the same time take some of the secretions for microscopical examination. You can also better treat these patients in this way, making strong applications, if need be, to different areas. It does not hurt the child. They get used to the position and submit readily to treatment in this way.

PROCEEDINGS OF SOCIETIES.

THE JOHNS HOPKINS HOSPITAL MEDICAL SOCIETY.

Monday Evening, October 17, 1904.

The meeting was called to order at 8 o'clock by the President, Dr. Thomas B. Futcher.

Election of officers.—The Society elected Dr. J. C. Bloodgood, President and Dr. C. H. Bunting, Secretary for the ensuing year.

Loss of Entire Lower Lip. Repair by Flap from the Arm. DR. WATTS.

This boy, who is 15 years of age, was admitted to the service of Dr. Halsted on July 6, 1904, with the history of having had his lower lip bitten off two days before by a circus pony with which he was playing.

On examination, the entire lower lip was found to be absent, even the periosteum of the lower jaw having been stripped off in places. The wound was clean and free from infection.

Considering the great extent of the wound, it was thought best to cover the defect with a flap from the arm, rather than to attempt to obtain a flap from the face or neck. Accordingly a large flap was dissected from the right upper arm. This flap which included skin and subcutaneous fat was about 12 cm. in width and 18 cm. in length. Its under surface and the raw surface of the arm, from which it was taken, were covered with grafts removed from the thighs. All of these

grafts took well and at the end of ten days we had a flap with skin upon both sides. Some of the skin upon its under surface was intended to form a substitute for mucous membrane upon the unattached portion of the lip, and to some extent prevent subsequent contracture.

The patient had a bad bronchitis for some time, following this operation, and further operative procedure was thus postponed more than a month. During this delay, the flap, which had already become considerably shortened by the sloughing of its distal extremity due to imperfect circulation, contracted to a wonderful extent.

On August 18, we dissected up the flap somewhat farther, in order to lengthen it as much as possible, and then sutured its free extremity to the left side of the wound in the lip. A small portion of the vermilion border which had been preserved on this side, was sutured along the upper edge of the flap.

The arm was held in place by means of a plaster cast for a period of about three weeks. The flap was then severed from the arm. This was done under local anæsthesia in several stages to allow the circulation to become more perfectly established.

The patient seemed very comfortable in the cast, the strained position of the arm causing almost no pain. At two subsequent operations, at intervals of two or three weeks, the lower and right borders of the flap were trimmed up and sutured in position. A very good functional and cosmetic result was thus obtained.

The photographs show very clearly the various stages of the operation.

Report of Cases. DR. CULLEN.

Adeno-carcinoma of the Umbilicus.

Dr. Cullen exhibited a growth which he had recently removed from the region of the umbilicus. The inguinal glands had become enlarged in consequence of metastases from the original tumor. A pathological examination showed the growth to be an adeno-carcinoma with the typical glandular arrangement. There was no evidence of any malignant process in the peritoneum or in any of the abdominal organs.

Cancer of Liver.

About a year ago Dr. Cullen presented to the Society a specimen of carcinoma of the kidney which had been removed by an operation in January, 1903. The patient remained well until June, 1904, a period of 17 months, when she developed a tumor which increased rapidly in size. As her temperature was 102½° and she was losing weight rapidly, she was removed to a hospital and an immediate exploratory operation was advised, notwithstanding the fact that she had but a single cystic kidney. Upon the abdomen being opened a large cancerous nodule the size of a cocoanut was found in the liver. It was thought not to be a metastasis from the original tumor, as the stump had been found free from thickening or secondary nodules. At first an attempt was made to remove the nodule by means of the cautery, and although it was possible to roll the liver out of the abdomen, it was found impracticable to use it. Long blunt needles were accordingly forced through the liver substance and mattress sutures were introduced and the tissue afterwards was carefully separated by the knife, the tumor being kept constantly in a state of tension. Two or three sutures were introduced at a time and the dissection was progressively done. If a large vessel was encountered it was picked up and tied. By proceeding in this manner the operation was completed without the loss of more than two drams of blood and the patient was removed from the table with a pulse of 104. The upper and under surfaces of the liver were drained and the patient was able to leave the hospital in about four weeks. In September she was seen again and definite nodules had appeared on the left side. Of course any further operation is not to be thought of.

A certain Russian who has worked with Mikulicz has shown that operations upon the liver are feasible if suitable suture material and needles are employed. The needles are to be carefully forced through the liver, shoving the vessels aside in their passage, and as many sutures can be inserted as are needed. Sections of the carcinoma of the liver and also of the kidney show that the two growths are identical and lead to the conviction that the liver growth is secondary to that of the liver.

Melanotic Sarcoma with Metastases.

He also reported a case of a patient who had a pigmented mole of the neck which was associated with a similar condition in the peritoneal cavity.

DISCUSSION.

DR. FUTCHER.—I think the first of Dr. Cullen's cases should be emphasized, as showing the important part played by pigmented moles of the skin. Here was a patient who had a pigmented mole on the neck with metastases in the peritoneal cavity. The importance of these apparently benign tumors of the skin has recently been emphasized by Dr. Keen in a paper read before the Surgical Section of the American Medical Association, at Atlantic City, in which he recommends the removal of all pigmented moles, owing to their liability to become malignant and to cause the development of metastases in various parts of the body. Some of the members of the present house staff will probably recall a case shown in the dispensary clinic, two years ago, of a colored man who had a pigmented mole over the right scapular region, with enlarged glands in the right axilla. We happened to discover the existence of this mole and mentioned its probable association with the enlarged glands. The patient went to another hospital later, was operated upon, and the enlarged glands in the axilla proved to be a melanotic sarcoma, from which the patient eventually died.

The umbilical nodule which was present in Dr. Cullen's second case is also of interest, because one has to remember that metastases not infrequently occur in this situation in association with malignant disease of the liver and stomach.

Clinically, it is not so very uncommon to find these metastatic nodules at the umbilicus in malignant diseases of the deeper structures.

Recurring Phlebitis of Obscure Origin. DR. BRIGGS.

(To appear later.)

DISCUSSION.

DR. B. B. BROWNE, JR.—I should like to ask Dr. Briggs if there was any tendency to urticaria in his cases. He has investigated carefully the histories as to rheumatism and gout, but does not mention urticaria. We know that urticaria is most frequently met with in rheumatic and gouty subjects and it may possibly be at times a factor of considerable importance in inaugurating changes in the arteries and veins. That a sub-endothelial infiltration can occur in the arteries in urticaria, similar to the infiltration of serum under the rete of the skin forming the "wheels," I feel sure of, from a case of urticaria which I recently observed, in which a distinct systolic murmur and thrill were noted over the aortic area and the thrill could be felt in some of the larger vessels, indicating a temporary narrowing of the vessels. If this condition should occur in veins where the *vis a tergo* is slight we would have a factor for the condition Dr. Briggs speaks of. I think all cases of arterio-sclerosis and phlebitis should be investigated as to a previous history of urticaria, and a trial made to ascertain the presence or absence of "factitious urticaria."

DR. BRIGGS.—I should perhaps like to add something in regard to the frequency with which the diagnosis of gout is made in these conditions. Tuckwell, who with Paget, has his name associated with the subject, laid it down as a law that every apparently spontaneous phlebitis was due to gout. He made spontaneous phlebitis as diagnostic of gout as Dr. Osler makes the recognition of tophi. To those who follow Tuckwell this present paper would have no justification, as all these cases would be characterized as gouty, but I have had unusually good opportunities of studying the first case and can exclude anything in the nature of gout. In the one other case that I have seen myself there was at the time I saw it Raynaud's Disease, and that has been put down in the list of ills which go with uric-acidæmia.

I should like to hear from Dr. MacCallum as to whether the pathological anlage is a condition of sclerosis or not. My idea was that a thrombus beginning at a sclerotic patch might extend beyond it itself, increase the sclerotic change, and so go on step by step up the vein. That is very tentative, of course, but there have been no studies at all made as to the pathology.

In regard to Dr. Browne's question, I would say again, with Dr. MacCallum, that my own views of the possible pathology were very theoretical and I have not studied the question as Dr. Browne has brought it up. There was no urticaria in the cases I saw, and in none of the other histories was it noted. There has been no mention made of that or of any other skin lesion.

Demonstration of Pathological Specimens. DR. MACCALLUM.

The first case illustrates a condition seldom so clearly shown as in the present instance, the embolic occlusion of the coronary artery of the heart. The case was that of a man past middle age who had long shown evidences of the presence of a ventral endocarditis. The final illness which led to his death was remarkable for its duration, as the intense symptoms began in February and lasted until October without, however, being characterized by the sweats which are so frequent in the cases of ulcerative endocarditis of shorter duration. Death occurred quite suddenly and at the autopsy which was performed next day the following condition was found: The heart is somewhat enlarged. The right side of the heart is unaffected except for the presence of two or three fresh vegetations on the edges of the tricuspid valves. The left auricle, however, shows a rough nodular mass of fresh vegetations upon its posterior wall. The mitral valves are thickly covered with large soft vegetations which have apparently developed upon valves already the seat of old lesions. These vegetations extend over the chordæ tendineæ many of which are ruptured and their ends rounded off by the masses of vegetations. So extensive has this rupture of the chordæ tendineæ been that the valve flaps freely through the auriculo-ventricular orifice and at the autopsy its two leaflets were found projecting upward into the auricle. It seems probable that the vegetations upon the auricular wall may have resulted from the implantation of bacteria from these flapping valves. The aortic valves bear upon the central point of each segment bulky vegetations. Of special interest however, is the condition of the coronary arteries. The right one is open throughout, and its walls are smooth. The left is plugged at its orifice as with a cork by a thrombus mass which projects less than 1 cm. into its lumen and which hangs free in the sinus of Valsalva. This mass is fairly tightly wedged into the orifice but can be easily pulled out showing that it has no attachment to the vessel wall which is quite smooth at its points of lodgment. Further along in the course of the vessel which contained only fluid blood, there are some yellow patches, but the degree of sclerosis is nowhere very marked. From the position and relations of the plug and especially from the fact that it projects free into the sinus of Valsalva without any attachment to the adjacent valve or to the aortic wall and is not surrounded by clot, it seems certain that it is an embolic plug and the immediate cause of the man's death. The heart muscle shows no special alteration. There were numerous infarctions of varying age in spleen and kidneys. The case is chiefly of interest because of those reported in the literature there are so few in which the occlusion of the artery can be so certainly described as due to embolism and not to local thrombosis of the sclerotic vessel. Chiari, Oestreich, Barth and Hektoen report such cases while Marie denies the existence of coronary embolism.

To illustrate this case other specimens may be shown in which the coronary occlusion was shown and death did not result instantaneously. In these we cannot say definitely that the plugging was of embolic nature. In the first three

in which the sclerotic coronary arteries are occluded by thrombus masses throughout a considerable part of their course, definite sharply outlined anæmic infarctions of the heart wall have occurred, in one instance leading to such softening of the tissue that a sort of aneurysm of the heart wall has been produced. The pericardial surface of such infarctions is covered with a fibrinous deposit. Another specimen shows a practically complete occlusion of the coronary by arteriosclerotic patches in its walls with the result that not an infarct, but a gradual disintegration and disappearance of the heart muscle fibers has occurred throughout the area supplied by that artery leaving a thin fibrous scar-like wall over a considerable portion of the ventricle upon the inner surface of which large globular thrombi have formed.

The second case which I wish to bring before you is that of a man who had suffered for years from dysentery. Toward the termination of his life, perforation of the intestine had occurred in the neighborhood of the urinary bladder and an abscess formed which had eventually ruptured into the bladder—other abscess cavities or sinuses had extended from this point far through the pelvic tissues encircling and isolating even the symphysis pubis and the neck of the left femur.

At autopsy the bladder wall was found to present numerous papilliform projections over almost its whole surface, but especially large and abundant immediately about the orifice through which the intestinal contents could filter into the bladder. These seem quite superficial and microscopically prove to consist of a much inflamed fibrous stroma covered by a somewhat thickened and folded layer of epithelium.

The condition found in the large intestine is especially interesting in affording the obvious explanation of many cases of polyposis of the intestine, resulting from long-standing inflammatory processes. There are extensive ulcers which have destroyed the mucosa and part of the submucosa leaving only islands and bridges of mucosa. In the upper part of the intestine these are overgrown by fresh epithelium, in the lower part especially in the rectum they are still uncovered and the undermining is relatively recent. So that the islands and bridges of mucosa retain practically the appearance of normal mucosa. Higher up, however, the islands have been elevated and rounded off by the contraction of scar tissue about them—a similar rounding off of the bridges of mucosa has occurred and frequently they have been broken through at one end so as to hang free by the other end in the cavity of the intestine. The proliferation of the mucosa which remains in these tags soon converts them into bulkier masses which are the polypoid structures so frequently seen after ulceration processes from whatever cause. Naturally this cannot be offered as the explanation for the other and more regular forms of polypoid growths in the intestine which are of quite different nature.

November 7, 1904.

The meeting was called to order at 8:30 p. m., by the President, Dr. Joseph C. Bloodgood.

Biliary Cirrhosis of Family Type. Dr. Osler.

Cirrhosis of the liver is not an easy disease for students to understand, as the multiplicity of forms is confusing and the striking differences between the descriptions in the text-books and the clinical pictures in the ward upset the equanimity even of the third year student.

A very easy thing to remember, and perhaps the best practical division of the forms, is according to the tissues in which the disease begins, namely: portal cirrhosis, biliary cirrhosis and capsular cirrhosis. The portal form starts in the portal vessels, perilobular and sublobular; the biliary form begins in the small biliary vessels, the canaliculi inside the lobules; and the capsular form starts about the capsule of the liver. There is a great deal of dispute about the biliary type. Many English authorities refuse to recognize such a form. Yet I think there can be no doubt that such does exist, characterized by; first, a protracted course, extending over a period of from five to ten, or twelve years; secondly, a persistent jaundice, often of great intensity, always chronic (not as in the ordinary types of cirrhosis appearing and disappearing, but remaining as a prominent feature of the disease) and being generally very intense; thirdly, pains, which are often of a mild character, chiefly in the hepatic region; fourthly, its occurrence in comparatively young persons not subjects of alcoholism but coming in the third decade, or even earlier; it is the type met with in children; fifthly, the absence of all signs of portal obstruction, no ascites, no distended veins, no hæmorrhoids, or vomiting of blood; and lastly the frequency with which these patients have hæmorrhages, particularly from the skin and mucous membranes. There are some other minor points, but those are the most important. It differs most markedly from the ordinary alcoholic form in the occurrence in young persons, without an alcoholic history and the persistence of the jaundice over a period of years. On examination you find an enlarged and hard liver, usually too, enlargement of the spleen. Now I find that students, as soon as they find an enlarged liver regard it at once as a type of biliary cirrhosis. That is an error. All forms of hypertrophic cirrhosis are not this type. It may be an alcoholic; in the early stages of portal cirrhosis there is enlargement. There may also be enlargement due to the presence of fat. It is probably a special form of alcoholic cirrhosis with hypertrophy, in which the increase in bulk is due to the presence of large amounts of fat. It is possible in some cases that a remarkable regenerative process may produce hypertrophy; the great enlargement that we sometimes see in the left lobe of the liver in cirrhosis may be due to active regenerative changes.

We have had a few cases of the genuine type of biliary cirrhosis in the Hospital; only six or seven. Recently a case has brought to mind two remarkable instances of the disease that we studied in the session of 1898. They were brothers called W., one thirty-two, the other twenty-four years of age. They came of a healthy family; no alcoholic history. One had had jaundice for nearly eight years; the other for four years. As some of you will recall they were very much alike. Both came at intervals to the dispensary and the one who

subsequently came into the Hospital was watched by many of us with great interest. He had in addition to the persistent jaundice an enlarged liver, pains in the hepatic region, which recurred at intervals for many years, and the fourth especial feature was hæmorrhage. He had recurring attacks of bleeding from the nose and subsequently from the gums; he bled continuously from the gums during the last five years of his life, being almost never without a slight oozing from the gums. He died, as nearly all these cases do, of a terminal infection. He had an increase of the jaundice, high fever and delirium and in fact all the features of an acute toxæmia. Blood cultures were made and the staphylococcus and streptococcus isolated. He had a greatly enlarged liver and a moderately enlarged spleen.

The brother had jaundice for four years and was intensely yellow. He too had pains on the right side in the region of the liver and had hæmorrhages, chiefly epistaxis. He also died of an acute terminal infection with high fever. There was no autopsy in his case.

Recently there has been in the wards a case that comes under this family variety or form of cirrhosis. A man, twenty-three years of age, a farmer from Virginia. He was admitted ten days or two weeks ago and had a good family history, so far as his father and mother and grand parents were concerned. He had had measles at ten and diphtheria and pneumonia six or seven years ago. He had had no malaria, no lues, and had no alcoholic history. He had had a chronic otitis media for several years. He had had an attack of jaundice at the fifth year from which he recovered. In October, '99, five years ago, he first noticed this yellow color, which has never cleared up, though it became lighter at times. He has lost in weight nearly twenty pounds in the past few months. He has occasionally had epistaxis and several times has vomited a small quantity of blood. He has had no pain and no fever. The coagulation time was three minutes. The liver was felt below the costal border and did not seem greatly enlarged; but the post mortem showed it to be much larger than we supposed from our palpation. There was no leucocytosis. The man's life was very miserable; he was in a wretched condition, and was anxious for operation. He was brought down one day for operation, but his blood coagulation time had gone up to ten or twelve minutes and he was sent back. On the day he was operated upon his coagulation time was one minute and forty-five seconds. At operation the bile passages were found clear, there was no obstruction. He had a few gall stones in the gall-bladder, but there was nothing in the bile passages themselves. He bled as these cases so often do following operation and died directly of the hæmorrhage. The post mortem Dr. MacCallum will speak of. We found out from a brother after the death, that this jaundice from which he had suffered was a family condition. He had two brothers with jaundice and two sisters. One brother had been operated upon in Washington Territory and the brother who came had jaundice and had had it for five years. Two sisters also have jaundice, so that it is quite possible that this represents another illustration of the family form of this type of cirrhosis. The condition of the liver is interesting and it is quite possible that it is an early stage of this capillary angio-cholitis which is supposed to be the essential anatomical feature in the biliary or true hypertrophic cirrhosis.

DISCUSSION.

DR. MACCALLUM.—At the autopsy it was found that the gall-bladder had been opened and drained—its wall was somewhat scarred, but especially thickened by the hæmorrhage which had occurred since the operation. The liver was very dark green in color, but the lobulation was not distorted, there were no evident bands of fibrous tissue throughout its substance and its consistence was not increased. The cystic duct, common duct, and hepatic ducts as far as they could be traced into the liver were delicate and normal in appearance. They showed no evidence of the presence of obstructions of any kind.

Microscopically it is seen that there is a very slight increase in the connective tissue about the portal spaces and in some instances about the central veins, but this is so slight as to be hardly distinguishable except by the aid of some special stain.

The liver cells in each lobule show a very marked degenerative change, especially in the more central portion of the lobule about the central vein. Many of them are actually necrotic and disintegrated. Leucocytes frequently crowd the capillaries and lie about among the broken cells in these areas. Where the bile capillaries are preserved they are frequently distended with green bile pigment.

There is no satisfactory explanation of the jaundice to be derived from this microscopical picture, although possibly the explanation recently offered by Eppinger for the development of icterus might apply here.

The process suggests a toxic origin, but it is difficult to decide as to the source of such a toxic substance.

DR. OSLER.—One interesting thing about these cases is that though intensely jaundiced, and perhaps in some of them a deeper jaundice than we see in any cases except those of malignant disease, it is not an obstructive jaundice because bile is present in the stools, though in small quantities. Even these cases of most intense jaundice still have bile in the stools. The whole essence of the process is apparently a capillary angio-cholitis. Of course in this case it may be an early stage of a process which may last for ten or more years.

Crossed Dissociated Sensory Paralysis with Lesion of Medulla. DR. THOMAS.

Situs Transversus and Atresia of the Pylorus. Clinical Notes, DR. LITTLE. Pathological Notes, MR. H. F. HELMHOLZ.

(To appear later.)

November 21, 1904.

The meeting was called to order at 8 P. M., by the President, Dr. Joseph C. Bloodgood.

Experimental Streptococcus Arthritis. DR. COLE.

I wish to speak briefly tonight of some work we have been doing in regard to arthritis induced by the action of streptococci, with especial reference to the etiology of acute articular rheumatism. At present acute articular rheumatism is regarded by most authorities as an acute infectious disease. Those who consider that it is due to bacteria hold various theories. These are that it is due to:

1. A specific micro-organism, as yet undiscovered.
2. Various pyogenetic cocci, mainly the ordinary streptococci; that it is a mild form of pyemia.
3. A specific streptococcus or diplococcus.
4. A specific bacillus—Bacillus of Achalme.

At present the second and third views have the most supporters and it is mainly these that we propose to consider.

The reason why this disease is thought to be due to a streptococcus or diplococcus is that in a number of cases clinically resembling acute articular rheumatism streptococci or diplococci have been isolated from the joints, from the heart's blood or from inflammatory exudates. Also Meyer, recognizing the frequent association of angina and rheumatism, made cultures from the throats of rheumatic patients suffering from angina and isolated from a number of them a streptococcus, which, when injected into animals, produced characteristic lesions or lesions resembling those of acute articular rheumatism. In 1902, Menzer reviewed the whole question and he concluded:

The cause of acute articular rheumatism is not a specific bacterium, but the ordinary parasites of the mouth, which under certain conditions have become pathogenic. Almost exclusively are streptococci the organisms concerned. These streptoccocci are by far the most common cause of the different forms of angina, and also of the so-called angina rheumatica.

Notwithstanding these conclusions regarding the specificity of these cocci, several English observers, namely, Poynton and Paine, Ainley Walker, Beaton and Walker, Shaw and Beattie, have continued to report the isolation of streptococci or diplococci from rheumatism cases, going so far as to name these Micrococcus or Diplococcus rheumaticus.

The claims of these observers as to the specificity of these organisms are based on cultural and morphological peculiarities and on experimental results obtained by the injection of these organisms into animals. As regards morphology, these observers are not unanimous, some of them considering the organism a streptococcus, others a diplococcus. Most agree, however, that they may appear either as streptococci or as diplococci, depending upon their environment. In fact, Walker, who has made the most extensive studies of the morphology and cultural characteristics of these organisms says:

We have no hesitation in saying that *without animal experiments it would almost certainly be diagnosed as an ordinary streptococcus by anyone* to whom cultures and stained preparations were submitted without comment.

Culturally this organism resembles a streptococcus, but that it is specifically different from the ordinary streptococci is rendered probable by our results on the application of the test of Marmorek.

Since, however, the value of this test for determining specificity has had so much doubt thrown upon it by the work of Meyer, and Aronson, and others, and especially since Walker's observations were so few and reported with such slight detail, this evidence at present, at least, cannot be considered very valuable.

The same may be said for the specific reaction claimed for it by Shaw, namely, the property of causing blood agar to change in color to a dull brown or rusty tint when this organism is grown upon it, while in the case of the common streptococcus this does not occur. Schottmüller, however, has shown that this property is common to a large number of streptococci from widely differing sources.

From all this it is evident that the claims for specificity of this organism must rest not on morphological or cultural grounds but on the peculiar lesions produced when inoculated into animals.

Practically all of the observers who have been mentioned as describing a coccus associated with rheumatic fever, have been able, by the inoculation into rabbits of quite large amounts of this streptococcus, to induce multiple arthritis of variable grades of intensity, in some cases endocarditis and pericarditis, and in a few experiments a condition said by the writers to resemble chorea.

My own work began with the study of a streptococcus isolated from the circulating blood of a man with endocarditis and septicæmia. For a year or more he had been troubled with "rheumatic pains in his joints," though no definite history of acute rheumatic fever could be obtained.

However, thinking it possible that the streptococcus might be the one described by Poynton and Payne, and others, we began inoculating rabbits, and rather to our surprise found that arthritis was produced with marked regularity, almost every rabbit showing some grade of arthritis. As, however, the cultures of this organism did not differ essentially from those of ordinary streptococci, we thought it better to proceed with streptococci from other sources. We made cultures and inoculations from six races of streptococci. The sources of these various races were: peritonitis following carcinoma of the stomach; puerperal fever-autopsy; blood during life in terminal septicæmia following myocarditis; empyema; blood during life in septicæmia following appendicitis; scarlet fever adenitis.

The diversity in the sources of these races renders it impossible that they could all have had any association with rheumatism, so that we could not have been working always with the so-called "Micrococcus rheumaticus."

The technique of inoculation was practically that of the English observers. The cocci were grown on solid media, an emulsion was then made and this was inoculated into the ear vein of a rabbit. With all seven races studied intravenous inoculation of amounts insufficient to cause death of the animals within six or seven days led to the production of mild grades of arthritis.

On about the fourth or fifth day after inoculation the rabbit usually appeared ill, remained quietly in a corner of its cage and only when it was put upon the floor and urged to move about would one see that it was quite lame. The lameness would sometimes appear in one leg and then in a day or two other joints would become involved. Usually recovery from the lameness occurred in a few days but in some death occurred. Other rabbits we killed while they were still lame. Still others we allowed to recover and then reinoculated when they would again show signs of arthritis. One we kept reinoculating in this way over a period of several months.

When the rabbits died or were killed, the joints were all carefully examined and certain of the joints were always found to contain a thick, sticky, tenacious exudate, very different from that found in the normal joints. In these affected joints the surface of the cartilage was smooth, but the capsular lining was usually injected and red and covered with the thick turbid exudate. There was also usually considerable œdema about the joint. Microscopical sections were made from most of the joints and the lesions carefully studied. Smears made from the exudate showed numerous polymorphonuclear leucocytes and a few mononuclear cells. Almost invariably diplococci were found in these smears; occasionally chains of three or four pairs were found. The cocci were usually flattened on one side, the flat sides approximated, so that one seeing them for the first time would certainly call them diplococci and not streptococci. Cultures were always made from the affected joints, however, and a typical growth of streptococci occurred in most cases.

In two of the rabbits a typical endocarditis occurred. The hearts of these rabbits have been preserved and I pass them around so that you can see the small vegetations present on the mitral valves.

Two of the animals on the day before death showed typical twitchings and incoordinate movements. They threw themselves about in the cage and when placed on the floor would run around and dash their heads into the wall, a condition which might be considered choreiform, but not at all analagous to the chorea we see in children.

The only reason we have to offer why this arthritis has not previously been noted by all observers who have done experimental work with streptococci is that usually such work is done with the idea of testing the pathogenicity of organisms, usually determined by the amount and time necessary to produce a fatal result, and when post-mortem examinations were made the joints have not been carefully studied as a routine procedure. During life a rabbit having arthritis will usually remain quiet in one corner of the cage, and it is only when the rabbit is placed on the open floor and urged to move about that the lameness is detected. So, too, in most cases the swelling of the joint, unless extreme, is rather difficult to detect through the thick skin and fur. Often a considerable distension of the joint and œdema of the surrounding tissues has been found after dissecting away the skin, when previously it could not with certainty be detected. In many cases the joint affection is mild, and unless one were especially interested in looking for it, it might be overlooked. It is only by making a routine examination of all joints that the lesions are discovered.

It may be stated that, while slight morphological and cultural differences existed between the various races of streptococci studied, none of these were constant enough to speak of a distinct variety. Each one differed slightly from the other in its manner of growth in bouillon, its growth in milk, etc. To make such comparative studies of any value, they should be repeated at intervals over a considerable length of time, to make certain that the characteristics have at least a fair degree of constancy. This has not yet been done with the organisms studied.

There was considerable variation in the pathogenicity as measured by the lethal dose of the races studied. Thus, while with certain of the organisms an emulsion made from the growth on six to eight tubes could be safely inoculated, in the case of the streptococcus obtained from the cervical adenitis in scarlet fever, one fourth of a tube caused death in five days when so inoculated.

As a result of this work we may say that arthritis and endocarditis may be produced by the intravenous inoculation of rabbits with streptococci from widely varying sources and that the results are similar to those described as produced by the inoculation with the so-called Micrococcus rheumaticus. I have seen the joints resulting from the inoculation of the organism isolated by Wassermann and also those produced by the organism isolated by Longcope and they do not differ from those produced here by these various streptococci.

Whether or not rheumatism is a form of streptococcus infection, I think we must still consider as undecided.

DISCUSSION.

DR. COLE.—During the past three years, in practically all cases of acute articular rheumatism treated in this Hospital, routine cultures have been made from the blood, and from the joints whenever any effusion was present in the latter. So far all our cultures from cases of acute articular rheumatism have been negative.

Similar results are reported by Philipp in the Deutsche Archiv für klinische Medicin, Band 76. He made cultures twenty-one times from the blood and six times from the joints in twenty-four cases of acute articular rheumatism. The cultures were made in a great variety of both solid and liquid media, and were cultivated both aërobically and anaërobically. Inoculations directly from patients were also made into guinea-pigs, rabbits, dogs, monkeys, and calves. But from none of these cases could any bacteria be cultivated.

DR. THAYER.—That was the result obtained by Singer some years ago.

Professor Smith on the Jersey Mosquito. DR. KELLY.

Prof. J. C. Smith, of Rutgers College, President of the Entomological Institute, who has written an admirable hand book on the mosquitoes of New Jersey, giving the

life habits of the more important species and an analytical key of some thirty species, presented me about a year ago with this handsome collection of eggs, embryos, larvæ and adult forms. Nothing like it, I believe, has ever been prepared before. There are as you see a great variety of culices, the anopheles punctipennis, and the psophora or giant mosquito. In each upper row, on the most delicate entomological pins, are the males, and on the lower, the females, while the bottles contain the larval forms.

I desire to present this to the Hospital, to be placed where it can be seen and studied by our students.

I would ask if there is any evidence that the anopheles punctipennis carries the malarial parasite? This whole question of mosquito distribution is so important that I will, with Dr. Osler's permission, offer to any member of the third year class, who presents next year a satisfactory thesis upon this subject, discussing the distribution of mosquitoes and presenting a map showing where they breed about the city, with suggestions as to the best methods of getting rid of them, a prize of fifty dollars.

December 5, 1904

Gastric Ulcer: Clinical Varieties and Symptoms. DR. HOWARD.

Dr. Howard gave the results of a careful study of ulcer of the stomach and duodenum based upon a series of eighty-two cases, with the following conclusions:

1. Gastric ulcer is rare in the Johns Hopkins Hospital as compared with cancer, the respective incidences being 1 to 225 and 1 to 56 general admissions.

2. Gastric ulcer in our series was as common in the male as in the female. In the male the percentage of greatest frequency was between the ages of forty and fifty—a decade later than usual.

3. Ulcer was in our cases relatively more frequent in the colored race and among Germans.

4. Vomiting occurred in 85.3 per cent; pain in 82.9 per cent, and hæmatemesis in 75.6 per cent.

5. Great loss of weight may be present; thus, in 36 cases there was a loss of more than ten pounds, and in 9 of forty pounds or more.

6. Our statistics would indicate that hyperchlorhydria is not so constant as usually maintained; it was present in only 17.6 per cent of our cases.

7. The blood picture is one of chloranæmia as seen from the average count (hæmoglobin, 58 per cent; red blood corpuscles, 4,071,000; white blood corpuscles, 7500 per c. mm.

8. Hæmorrhage was the cause of death in 8.5 per cent of the total number of cases, and in 29.5 per cent of the fatal cases.

9. Perforation is rare (3 cases, or 3.6 per cent of our series). General peritonitis occurred in but one instance (1.2 per cent).

10. Ulcus carcinomatosum is rare—at least 4.8 per cent of our series.

11. Operation is indicated in all cases with perforation or perigastric adhesions, and in cases of copious or recurring hæmorrhage, when medical means have failed after a fair trial.

12. The mortality of the series was 29.3 per cent; in the cases, however, who received treatment there was a mortality of only 18.8 per cent; in those receiving medical treatment alone, 8.6 per cent.

Gastric Ulcer: Diagnosis and Medical Treatment. DR. MCCRAE.

In common with the majority of diseases one must recognise that the diagnosis of gastric ulcer in typical cases is usually very easy, in atypical cases very difficult. We have to keep in mind that a large number of cases are latent and that it is sometimes impossible to make a diagnosis. The experience of the post mortem table proves that. Perforation or hæmorrhage may occur without any previous history. Concerning ordinary typical cases very little requires to be said. The pain with its characteristics, the presence of blood and especially of blood microscopically are important. In a large percentage of cases blood is vomited, but it is important in cases in which there is no vomiting of blood to make a careful microscopical examination. One has to exclude cases where the presence of blood follows excessive straining. Hyperacidity is not regarded by us in this country as so frequent as by the German authorities. Coming to the more atypical cases one has to distinguish certain other conditions from ulcer, the most frequent of which are the various gastric neuroses. That is in many cases difficult to do and in many instances one has to leave the matter open. Fortunately the medical treatment may be the same whether the case be one of neurosis or ulcer. The pain is not so constant in the neuroses and repeated gastric analysis usually aids the diagnosis. Next probably comes the diagnosis from gall-stones. The character of the gall-stone attacks with their very severe character, the rapid onset and rapid recovery, generally help us, and the symptoms are not so constant. The gastric crises of locomotor ataxia rarely give much difficulty. Practically all the acute abdominal conditions may give trouble at times. In the chronic ulcer the most important point in diagnosis is that to be made between ulcer and neoplasm, and in many cases this is very difficult. In the majority of cases the finding of a large mass and free hydrochloric acid speaks for ulcer, but we have to remember the possibility of a neoplasm having developed in a former ulcer, in which the free hydrochloric acid is retained. In such a case if one is in doubt there should be no hesitancy in turning the case over for surgical exploration, especially as the procedure for diagnosis and treatment is the same.

Turning to the question of treatment I think it is well to discuss this in three groups of cases; first, the doubtful cases, largely composed of those where the diagnosis is between gastric neurosis and ulcer. The treatment of this doubtful group may come under the same heading as in the second group, the ordinary acute ulcer, the third group being the chronic ulcer.

As to the treatment of the ordinary acute gastric ulcer, in

which one may also put the doubtful cases, the first essential is absolute rest in bed for a period of at least four weeks in the average cases. The rest is important in itself because by keeping the patient in bed you can control the question of feeding. In the majority of cases if the necessity of rest is properly explained, stress being laid upon the danger of the ulcer becoming chronic and the complications that may arise, the majority of patients will submit. In the treatment of the ulcer itself the essentials are rest, absence of irritation and the securing of the best blood supply. Rest is best secured in the majority of cases by the withdrawal of food by the mouth for a few days. That depends a little on the severity of the case and an average of four to six days is generally enough, during which time the patient is to be fed by the bowel. A small amount of water by the mouth may be allowed. As a rule at the end of four days of starvation it is well to begin with small amounts of liquid nourishment. Of foods milk stands first, probably given best peptonized or in the form of whey. One should begin with small quantities and gradually increase the amount. As a rule it is best for the first ten to fourteen days not to give anything else but milk. Probably a quart is enough in the majority of patients, though some writers advise two quarts a day. As a rule it should be given well diluted and with an alkali, either with an alkaline water or with a small amount of bicarbonate of soda. At the end of ten days or two weeks one may increase the diet gradually and more milk may be given, then the gruels, beef juice, jelly, etc., until at the end of four weeks one has the the patient back on soft food again. It pays to be conservative, to go slowly, increasing very little from day to day, and if any signs of irritation arise put the patient back on liquid diet at once.

To reduce the gastric secretions atropin may be given in 1/150 or 1/100 grain doses before food. Large quantities of alkalies should be given, sodium bicarbonate and magnesium carbonate in large doses. This probably in the majority of cases will be enough but there are a few other drugs which we usually employ, not perhaps in every case, with the idea of assisting the process of healing. Perhaps the most useful are bismuth, silver nitrate and olive oil. In giving bismuth in gastric ulcer one should give large doses, if by the mouth, dram doses at least four to six times in the twenty-four hours. An ounce may be given at one time through the stomach tube. Many writers advise washing out the stomach and then putting in an ounce of bismuth with water. Silver nitrate may be given in capsule, followed by half a glass of water, or dissolved and taken through the tube, the essential thing being to have it fresh. Of olive oil an ounce may be given at a time, perhaps four times in the twenty-four hours. A doubtful question is that of washing out the stomach. I think in the majority of cases one may wash out the stomach if the patient is having pain, lavage with an alkaline water often giving relief. In the majority of cases, however, the tube is not required. There is little danger if it is done with caution. An important point to keep in mind is that your treatment must not stop when the patient, so to speak, is well. The gastric ulcer is very prone to recur and one should certainly keep track of these patients for a year, watching the diet and keeping up the use of the alkalies. If this were done there would be fewer cases of relapse. The use of alkaline salines is always helpful, for instance, Carlsbad salts. If there be anæmia iron should be given.

In the chronic cases we have quite a different condition. The ordinary acute case if taken early and treated systematically does extremely well; in the chronic ulcer it is different. But in the majority of these cases, unless there is indication for operation, I think it is well to give the same treatment as in the acute cases, remembering that it must be for a much longer time. If they do not improve under the ordinary treatment which we have gone over it is well to consider the advisability of surgical measures, and I think they are certainly demanded in three conditions: one for diagnosis, where there is doubt as to malignancy. The second is in cases of repeated hæmorrhages. If you wait until the patient is exhausted and his hæmoglobin is low from repeated hæmorrhages you greatly handicap his chances. The third is the occurrence of pyloric stenosis due to ulcer.

With care in the diet and the use of the drugs mentioned pain is usually not troublesome, but in many cases certain of the sedatives are required. Small doses of the bromides with codein is enough sometimes but in some cases morphia must be given. It is best to give it by mouth and accompanied by bismuth. Morphia hypodermically is to be advised against in ulcer cases. There is only one treatment for perforation and that is immediate operation, but in order to be able to do that you must have made preparation beforehand. Just as the prognosis in operation for perforation in typhoid fever depends upon quick diagnosis, so it is in perforation of gastric ulcer. Those looking after the case should report at once any sudden abdominal pain or any sudden change in the patient's condition. The treatment of hæmorrhage in the acute case is largely that of rest; I am speaking of the ordinary hæmorrhage which we see and which is generally not alarming. Practically all we have to do is to cut off the food by mouth and give morphia hypodermically. The value of styptic drugs by the mouth is doubtful. There are certain of these cases in which hæmorrhage is the direct cause of death, and in such cases operative procedures may be justified. If there are repeated hæmorrhages it will be well to have the patient operated on. In the great majority of cases, as in cases of pulmonary hæmorrhages, if the patient does not die at once there is very little danger. In the chronic cases the repeated hæmorrhages are a strong indication for operation.

The patient with gastric ulcer has the right to demand two things: first, from the surgeon, that his technique be as good as possible so that there is no risk more than that incident to his condition in having operative procedures carried out, and I think the surgeons have fulfilled this; second, he has a right to ask the physician that he recognise when the necessity for surgical interference has come.

DISCUSSION.

DR. PANCOAST.—I should like to report two or three unusual features in a case of perforation. The first is that although the perforation occurred forty-eight hours before operation the patient is alive at the end of three weeks. He had a high grade of peritonitis throughout the greater peritoneal cavity and so far as the general peritoneal cavity is concerned the peritoneum is taking care of itself. A second point of interest to me is that the patient was distinctly jaundiced and had bile in the urine, and in his general peritoneal cavity. There was a large amount of bile in the general peritoneal cavity, so much that the contents were dark green. A third point of interest is that he has developed since the first operation two secondary abscesses. One in the pelvis was easily drained through an incision on the other side of the abdomen. The other abscess was drained last night through the 9th intercostal space on the left side. 1600 cc. of pus were removed. It was probably a subphrenic abscess. The patient is very ill and probably will not recover.

December 19, 1904.

The President, Dr. Joseph C. Bloodgood, in the chair.

Report of a Case of Ulcerative Endocarditis, with Embolism of the Aorta. DR. OSLER.

The patient, aged 12 years, a factory girl, was admitted November 3, 1904. Past history negative. No history of genito-urinary infection. Onset of present illness October 24, with chill, fever, headache and some abdominal pain. Chill came on while at work and was followed by a chill every day afterward. She vomited daily and was thought to have typhoid fever. She was admitted to Ward G on November 3. Physical examination was practically negative, except for a rather rough systolic murmur at the apex transmitted outward to anterior axillary line, but not heard in the axilla. The second pulmonic sound was not accentuated. Edge of spleen could be felt. There was active knee-jerk and ankle clonus present. Koenig's sign absent. Leucocytes were 28,000. Temperature high, irregular, and there was a daily chill. Sweating slight. The systolic murmur increased in intensity and was transmitted into axilla. Petechiæ appeared over the face, chest and arms. On November 8, lumbar puncture gave 70 cc. very clear fluid. Pressure 280 mm. Culture negative. There was a slight vaginal discharge but no intracellular diplococci. On December 4, for the first time there was a presystolic thrill and rumble. She also cried out with pain in the lower limbs and there was apparently anæsthesia below the knees. Stools and urine were passed involuntarily. No pulsation could be felt in the dorsalis pedis or popliteal. On December 5, feet were not cold or discolored. Knee-jerks were present, but diminished. On December 7, pulsation felt faintly in popliteal. Widal was repeatedly negative. Blood cultures were made on November 4, November 11 and December 4. Urine cultures on December 15, and November 22. The patient died December 16.

The illness was of six weeks, with high and irregular fever, and with no special embolic features until two weeks before death; there was a great deal of doubt at first whether it was typhoid fever or endocarditis. The diagnosis was reached by exclusion, and it was not until the murmur increased in intensity and changed in character and the cardiac symptoms became more positive that a definite diagnosis was made of ulcerative endocarditis. A point of special interest is that a week before death she had paralysis of her legs with slight change in sensation and complete absence of pulsation in the arteries. Of course we suspected a plugging of the vessels, probably of the aorta, but strange to say, instead of the usual sequence, namely, change in color of the feet, at first bluish, then black, and almost certainly followed by gangrene, in this case the legs remained cold, sensation was reduced; there was no pulsation in the vessels, but no gangrene followed, and there was not even change in the color, a most unusual thing.

The specimen, which is a most remarkable one, shows typical ulcerative endocarditis of the mitral valve with a large thrombus occupying the lower part of the aorta and blocking it completely. There was a small embolus in the spleen and one in one kidney.

We had another illustration of plugging of the aorta by thrombus in a case of chronic mitral disease and I show the specimen.

Case of Typhoid Fever showing some Unusual Features. DR. COLE.

Dr. Osler has asked me to speak of a case of typhoid fever in a young colored girl, showing some unusual features. The child, aged 10 years, was admitted on December 8. The onset of the illness occurred on December 1 with a violent attack of vomiting. Following this there was fever and some pain in the right side of the abdomen. There was no delirium. The child remained in bed, but on December 8 walked to the hospital and did not seem very ill. While waiting to be sent to the ward, however, there suddenly developed active, talkative delirium. This continued almost constantly, and slight stiffness of the neck and extremities developed. On December 12, a lumbar puncture was performed and 25 cc. of fluid obtained under normal pressure. No growth occurred in the cultures from this fluid and microscopical examination was negative. The Widal test performed on December 10 was also negative. The fever continued high, between 102° and 105°. The signs of meningitis became more definite, there was retraction of the head, the knee-jerks were active, and a fairly definite Kernig's sign was obtained.

Notwithstanding this, a second lumbar puncture performed on December 16 gave negative results as before. On the same day, however, the Widal test was positive, and in cultures made from the blood a pure growth of *B. typhosus* developed. The abdominal pain continued; she grew gradually worse and died on December 18.

This case was interesting, first, from the standpoint of diag-

nosis. The marked meningeal features and absence of any definite signs of typhoid fever made the diagnosis difficult. The first definite evidence that we were dealing with a case of typhoid fever was given by the blood cultures and Widal reaction. Second, this case well illustrates the not infrequent occurrence of marked meningeal features during typhoid fever. As I have previously stated, these cases may be divided into three groups: first, those in which there is no direct association of the bacilli with the cerebral manifestations, and no lesions are to be found in the brain to account for the symptoms; second, those in which the bacilli are present in the spinal fluid, but no marked inflammation of the meninges is present; and third, the cases of true suppurative typhoid meningitis.

This case is a good example of the first group, and of those cases to which certain of the French writers have applied the term *méningisme*. In this case lumbar puncture was performed on two occasions with negative results, and at autopsy absolutely no lesions could be demonstrated in the brain or meninges. Typical typhoidal lesions were found in the intestines and there was very marked enlargement of the lymphatic glands, the mesenteric glands and Peyer's patches being of enormous size, as you can see in these specimens which I exhibit.

DISCUSSION.

DR. OSLER.—It is difficult in these cases to determine whether a true meningitis is present or not. I would refer you to Stokes' well-known dictum that the acute congestion of the cerebro-spinal centers in fever may give rise to all of the symptoms of a meningitis; there may be no single symptom absent in cases where there is only this extreme engorgement. We have had several instances where the meningeal symptoms were very marked without the existence of actual meningitis.

Puerperal Infection with Gas Bacillus. DR. LITTLE.

(To appear in April BULLETIN.)

Report of a Case of Arteriovenous Aneurism of the Thigh. DR. OSLER.

Many of you may recall that about three weeks ago I showed at the clinic three remarkable cases of aneurism, one of them an arteriovenous aneurism of the femoral artery in a man aged twenty-nine years, who was shot 15 years ago. The tumor has gradually grown to about half the size of a pineapple. The leg was greatly enlarged, blue to the foot, and on palpation over the tumor there was a remarkable vibratory thrill which could be felt up the thigh over the entire anterior and posterior portion of the leg. On listening with the stethoscope one could hear a murmur of great intensity, a humming-top murmur, intensified with each systole. I called your attention at that time to the original description of the disease by William Hunter, which pass around again, as it is the first account of this form of aneurism. Yesterday this man died suddenly, and Drs. Cole and MacCallum secured the specimen.

DISCUSSION.

DR. MACCALLUM.—Orth divides the traumatic aneurisms in which communication between artery and vein is established into three groups: (1) the arteriovenous aneurism in which an ordinary aneurism has ruptured into a vein; (2) the aneurisma varicosum in which a sac lying between the two vessels forms the communication between them; and (3) the varico-aneurismaticus in which the artery and vein are intimately united and communicate through openings in their walls. The sac which forms in the second variety is the result of the encapsulation of a hæmatoma through which the blood still circulates.

Bramann (Arch. f. klin. Chir., XXXIII), has collected 141 cases, of which the greater number resulted from venesection, but there were also 35 cases of communication between the femoral artery and vein. The condition is usually produced by such an injury as a stab or gunshot wound. The present case does not correspond precisely with any of Orth's classes. The femoral artery is greatly dilated and at about the beginning of the lower third of the thigh it shows two perforations separated by a bridge of tissue. The femoral vein lying close beside it shows one perforation at the same level. A probe can be passed from the artery into the vein through these apertures; in so doing it passes the orifice or mouth of a sac about 12 cm. in diameter which lies to the inner side and somewhat in front of the artery and vein. The sac thus does not form the communication between the vessels, although the probe passes readily from either into it; nor are they directly united, but rather by way of a small space or vestibule which lies in front of the orifice of the sac. This sac is formed of dense fibrous tissue and is lined by a granular, deeply pigmented clot. The veins were enormously distended both below and above the level of the communication. The stagnation was such that the man suffered for many years from a persistent leg ulcer.

Operative interference is seldom advisable in such cases on account of the risk of gangrene.

DR. OSLER.—The question of operation is a very interesting one. You may remember that by a curious coincidence the other day upon which I showed this patient at the clinic I received a letter from an old friend, a patient of mine, who had had for many years an arteriovenous aneurism in the axilla. He was a man of 43, who when 15 years of age was running down a steep grade with a lead pencil in his pocket and it penetrated his axilla. He had a sudden redness and then blackness of the hand with the gradual growth of an aneurism, and he has had that aneurism ever since. He is a strong, vigorous man. He has had the day fixed for operation, but I think wisely, deferred it. The great danger of operating is in the gangrene which is apt to follow. A very interesting case was reported a short time ago by a Spanish surgeon, who in a case of this kind opened the artery, stitched the orifice and closed it up again and the man made a complete recovery.

Survey of Ovariotomy at Extremes of Life. Report of a Case in a Child aged Five. MR. H. I. WIEL.

(See this BULLETIN, page 102.)

NOTES ON NEW BOOKS.

A Text-book of Human Physiology. By ALBERT P. BRUBAKER, A. M., M. D., Professor of Physiology and Hygiene in the Jefferson Medical College; Professor of Physiology in the Pennsylvania College of Dental Surgery; Lecturer on Physiology and Hygiene in the Drexel Institute of Art, Science, and Industry. With colored plates and 354 illustrations. (*Philadelphia: P. Blakiston's Son & Co., 1012 Walnut St., 1904.*)

At a time when contributions to the subject of physiology are being made with unprecedented frequency, contributions containing facts not alone of a supplementary but often also of a revolutionary character, it becomes the duty of a writer of a text-book to select from the mass of conflicting data facts that are the most important and fundamental. These should be treated of fully but with the avoidance of unessential detail. At the same time every effort should be made to preserve the spirit of the subject, the spirit of a live science, and to instill it into the reader.

The following quotation taken from his preface bears witness to the fact that the author has borne in mind the necessity of sifting the essential from the unessential. "The object in view in the preparation of this volume was the selection and presentation of the more important facts of physiology, in a form which it is believed will be helpful to students and to practitioners of medicine." This we believe the author has in a large measure succeeded in accomplishing. It is of course manifestly impossible for different individuals to agree in all cases upon the phases of the subject that are to be considered the most important. In the opinion of the reviewer the author has in most instances used excellent judgment. Furthermore, it is particularly gratifying to find that the latest important work in all fields, but particularly in the fields of digestion and absorption, has been incorporated in the text.

But it is disappointing to find that the subject-matter has been handled just as it has in the past been handled by most English-speaking authors. No significant references to original articles are given and but very few names are mentioned. Those that do appear are almost exclusively names of Americans. The impression is therefore conveyed to the uninformed reader that almost the whole subject of physiology has been evolved from the brain of but a single individual. The objection might be raised by the writers of text-books that the introduction of names into the text and the historical development of our only too uncertain knowledge detract from what all must acknowledge to be the most important object of a text-book, namely a clear presentation of the facts. However, in the experience of the reviewer references to such points do not hamper the average student and under any circumstances they give the subject its true aspect, and increase the intefest of the intelligent reader in it.

It is hardly necessary to dwell upon the general arrangement and scope of the book. The subject-matter is subdivided into chapters in the way that is usual in text-books of physiology intended for medical students. The "chemic" side of the subject is unusually brief. Perhaps the author intended this part of the book to be supplemented by a special course in "physiologic" chemistry. However, this cannot be said of the introductory "anatomic" descriptions. These are always full, particularly the one that has to do with the central "nerve" system. The "physical" aspect of the subject is likewise fully treated.

First Report of the Wellcome Research Laboratories at the Gordon Memorial College, Khartoum. By the Director, ANDREW BALFOUR, M. D., B. Sc. (*Department of Education, Sudan Government: Khartoum, 1904.*)

Readers who are familiar with Kipling's poems may remember that in one of them, called "Kitchener's School," the changes to be brought about in the Soudan after its occupation by Kitchener's army are foretold. One of the verses is as follows:

"He said 'Go safely, being abased. I have accomplished my vow.'
That was the mercy of Kitchener. Cometh his madness now!
He does not desire as you desire, nor devise as ye devise;
He is preparing a second host—an army to make you wise!"

The battle of Omdurman was fought in 1898, and now in 1904 we have the first report of the Wellcome Research Laboratories of the Gordon Memorial College at Khartoum. There could probably be no stronger example of the better influences of civilization.

Perhaps the most interesting articles are those in reference to mosquitoes. There is one dealing with the varieties of mosquitoes found in Egypt and the Soudan and the description of the work which is being done for their destruction. Insects and parasites injurious to crops are also considered and there is a section dealing with the general routine work of the Laboratory. The incidence of bilharzia is of special interest. Leprosy is noted as being comparatively common; they have also had an epidemic of cerebro-spinal fever. Tuberculosis is stated to be frequent and lues very prevalent, the more serious luetic lesions being apparently very common.

This first report is an excellent one considering the difficulties which had to be surmounted, and we shall look with interest for further work from this laboratory.

Records of the Egyptian Government School of Medicine. Volume II. Edited by the Director. (*Cairo: National Printing Department, 1904.*)

This volume contains a number of papers, some of which are of considerable interest. Dr. Phillips gives the record of one hundred consecutive cases of ascites in a Cairo hospital and discusses the causal factors, laying special stress on the rôle played by malaria. He notes the large number of cases of ascites in the hospital wards and this in a locality where but little alcohol is drunk. He is inclined to lay great stress on malaria as a causal factor, and out of his one hundred cases considers that in twenty-two this was definitely established. In twelve other cases the diagnosis is doubtful. If proved, these are exceedingly interesting findings and quite contrary to the experience of this country, where malaria is not regarded as an important causal factor of cirrhosis of the liver. On going through the details of these cases it does not seem that Dr. Phillips has sufficient evidence on which to base a diagnosis of malarial cirrhosis of the liver.

There is an interesting article on some of the unusual manifestations of bilharzia, especially with involvement of the abdominal viscera. Dr. Milton gives a more general description of bilharziosis.

An article of considerable interest is a description of the customs and superstitions of the modern Egyptians connected with pregnancy and childbirth. The volume concludes with a well-illustrated article on the morphology of the human brain, with special reference to that of the Egyptians.

Altogether the volume is a very creditable one. It would seem advisable, however, to have such reports in a volume of smaller size. A folio is not very convenient for ordinary reading.

A Text-Book of Human Histology. Including Microscopic Technic. By DRS. A. A. BÖHM, and M. VON DAVIDOFF, of Munich, and G. CARL HUBER, M. D., Professor of Histology and Embryology in the University of Michigan, Ann Arbor. Second Edition, Thoroughly Revised and Enlarged. Handsome octavo of 525 pages, with 376 original illustrations. (*Philadelphia, New York, London: W. B. Saunders & Co., 1904.*) Flexible Cloth $3.50 net.

The Böhm and von Davidoff text-book of histology has since its first appearance been a favorite with students who read German.

And the translation, edited and extended by Dr. Huber is even more deserving of a similar reception by English-reading students. The book though elementary is comprehensive—and the descriptions are accurate and clearly put, and do not bear the ear-marks of a translation. The work as a whole is well-balanced and no hobby is ridden to an extreme to the exclusion or curtailing of more important subjects. Nor do unsettled questions receive dogmatic answers. The illustrations are numerous and in the main of advantage to the reader. One regrets that in this second edition the list of references has been omitted—on account of lack of room. The few extra sheets necessary would by no means make an unwieldy volume, and if it did a little economy in descriptions of microscopes, microtomes, etc., would restore the equilibrium and give a more valuable book to the student.

A Manual of Personal Hygiene. Proper living upon a Physiologic Basis. By American Authors. Edited by WALTER L. PYLE, A. M., M. D., Assistant Surgeon to the Wills Eye Hospital, Philadelphia. Second Edition, Revised and Enlarged. (*Philadelphia, New York, London: W. B. Saunders & Co., 1904.*)

This is a useful and well-written book and we are gratified to know that it has attained a second edition. The need of such a manual is apparent to any one who examines the inquiry columns of any newspaper which replies to inquiries as to health and hygiene. The possession of the book would render most of these questions unnecessary. It is well printed and well illustrated. The language is simple and clear.

A Manual of Experimental Physiology for students of Medicine. By WINFIELD S. HALL, Ph. D., M. D. (Leipsic), Professor of Physiology, Northwestern University Medical School. With 89 illustrations and a colored plate. (*Philadelphia and New York: Lea Brothers & Company.*)

The appearance of a really good manual of experimental physiology is always greeted by the advocates of the experimental method with a feeling of satisfaction. The possession of a good laboratory guide by the student is of advantage not only to the student himself but also to the instructor who is thereby relieved from much of the tedium of repeating again and again the same directions and urging again and again the same warnings.

From the preface of Prof. Hall's new book, we learn that the author has, up to the present, furnished his class with typewritten syllabi of their laboratory exercises. These syllabi, having been revised almost annually, constitute the present volume, which, therefore, represents the accumulated experience of some ten years of teaching.

The point of view of an author is usually indicated by the space which he allots to the various subdivisions of the subject treated by him. Consequently the following data are not without significance:

	PAGES.		PAGES.
Muscle-nerve	35	Digestion, etc.	21
Circulation	27	Nervous system	15
Vision	27	Cytology	15
Hæmatology	27	Muscular system	5
Respiration	21		
		Total	240

Here one sees well exemplified the excellent and growing tendency to diminish the amount of "frog work" and to substitute for it experiments on man and the mammalia, for the part of this work devoted to the physiology of nerve and muscle is but one-eighth of the whole. Urine examination and Physiological Chemistry (with the exception of experiments in digestion) are not included in the volume but a number of experiments on the action of drugs are described. For the latter Prof. Hall expresses his indebtedness to Prof. C. H. Miller.

The nine chapters into which the book is divided may now be considered in turn:

I. *Cytology* comprises a brief study of the algæ and protozoa, also of the action of cilia both under normal conditions and under the influence of Co_2 and anæsthetics. Finally the method of estimating the amount of work done by cilia is described.

II. *Muscle and Nerve* includes a helpful explanation of the electrical apparatus usually employed accompanied by a number of simple schemata showing the arrangement of electrical connections.

III. *Circulation.* The insertion here by the author of a number of simple experiments in hydrodynamics, as an introduction to the study of the circulation, is to be commended. Considerable emphasis is laid on the mammalian vivisections; not only are the actions of the vagus and sensory nerves studied but also the effects of atropine, pilocarpine, digitalis and other drugs are observed. Some objections might be raised to the author's use of the term "pulse pressure," by which he designates the systolic pressure as determined by feeling the *pulse* at the wrist (Riva-Rocci method).

IV. *Respiration* describes some experiments on the effect of varying the composition of the inspired air. The respiratory quotient is also determined. One misses, however, an adequate consideration of the action of the afferent nerves (especially of the vagus) upon the respiratory center, although the function of the phrenic nerve is carefully studied.

V. *Normal Hæmatology* is the work of Dr. C. J. Kurtz. The usual methods of blood counting and hæmoglobin estimation are described. Among the latter one finds no mention of the most accurate of all, Miescher's modification of von Fleischl instrument. Differential counting is aided by a plate picturing the various forms of blood corpuscles.

VI. *Digestion and Absorption.* As a somewhat novel feature, one finds here a number of experiments such as those on the diffusibility of proteids illustrating the physical basis of absorption.

On VII, *Vision*, no comment need be made.

VIII. *Nervous System* treats of reflexes, skin sensibility, functions of the dorsal and ventral roots, effects of strychnia, curare, and veratria, etc.

IX. *Muscular System* deals with observations on the movements of man and with ergography. The value of the former may be questioned, while the ergographic experiments of students are usually regarded as unsatisfactory.

The *Appendix* contains practical hints regarding various supplies, appliances and methods.

"The proof of the pudding is in the eating," and it is not for one who has not employed Prof. Hall's book in his classes to speak authoritatively upon its value but careful perusal of the work will, it is thought, convince the reader that this manual possesses substantial merits.

Physician versus Bacteriologist. By PROF. DR. O. ROSENBACH of Berlin. Authorized Translation from the German by DR. ACHILLES ROSE. (*Funk & Wagnalls Company, New York and London, 1904.*)

Scientific papers usually consist of two parts; first, records of observations or statistics, and second, opinions or conclusions drawn by the writer from the given data. Consequently there are opportunities for error, both in observation and judgment. Many errors undoubtedly arise from deducing too extensive conclusions from insufficient observations. It is much easier to think than to see, and still easier to talk than to reason.

Since this is true, it would be very remarkable if, in the rapidity with which certain branches of medical knowledge have advanced, especially the science of bacteriology, errors should

not have arisen, which only further observations have corrected, or which are still generally regarded as truths.

To any one who wishes to set the scientific world right two methods are open, either the recognition of the generally accepted observations as correct and the demonstration of errors in reasoning by which conclusions have been deduced from them, or the presentation of new facts which in themselves are evidence of previous faulty observations or disprove the previous conclusions. And these new facts must consist of specific instances and not of broad generalizations based on the critic's impressions.

Attacks on conclusions with new conclusions by one who offers no new facts or only broad generalizations do not usually carry strong conviction. It is for this reason that the attack of Prof. Rosenbach on the bacteriologists will have little effect.

The chief thesis of the writer seems to be that bacteria are not the ultimate cause of most of the infectious diseases, but that predisposition is the important factor, bacteria playing entirely a secondary and unimportant rôle. But it is not the *physician* alone who lays stress on predisposition. In fact, pure bacteriologists have long recognized its importance and have adduced much experimental evidence in relation to it.

Many of the papers comprising the volume have appeared before, some of them at a period somewhat remote, so that at present they have lost much of their force. This is true of the paper attacking the therapeutic value of tuberculin, though we doubt very much whether this paper had much share in establishing the opinion at present generally held. On the other hand time has not shown the truth of the writer's opinion in regard to diphtheria antitoxin and no evidence or arguments are presented sufficient to change our opinions.

It is impossible here to enter into a discussion of all the views advanced by the writer. Suffice it to say that most of them are at variance with views currently accepted in regard to the relation of bacteria to disease. To those unfamiliar with the previous writings of this author it will be somewhat of a shock to find a German professor advancing such unusual opinions. But every man has a right to his opinion, and that of a man who has formerly done important work in pathology should receive a hearing. In a number of points discussed the last word has not yet been spoken and any new light should be gladly welcomed. We cannot see, however, that anything really new has been added to the subject by this book.

On almost every page are dogmatic statements entirely unsupported by evidence, while in places the most visionary theorizing is indulged in which might delude the undiscriminating reader. All this is concealed in a mass of words which rival the most obscure passages of Henry James; for example: Predisposition "depends upon the primary stimulability of the protoplasm, *i. e.*, upon the extent of innate faculty of causation which is identical with the primary (intra-molecular) combination of the atoms, and upon the extent of the at-all-possible transposition of energies, which is identical with the intermolecular power of combination, by which the molecules of different qualities are united into one aggregate of molecules!" (p. 84).

Just why there should be such a serious enmity between the physician and the bacteriologist is not made perfectly clear. The author writes, however, "And not only those (evidences) which the physician, endangered in his possessions, is justified in bringing forward to secure his rights, in opposition to the demands of the bacteriologists (who dare to direct the course of this world from their official table and to ignore well established facts), but also proofs of the social and ethical dangers which would arise from an absolute supremacy of bacteriology." No wonder that the physicians should challenge such bacteriological monsters!

The bacteriologists whom the author challenges apparently have no sense of modesty, for they "by means of fallacious conclusions, have established—in opposition to all common sense—the dogma that all infectious diseases are caused by bacteria." We should like to meet with some of these enthusiastic bacteriologists. We cannot see that any good can come from a book written in such an attitude of mind.

The translator has performed a service of doubtful utility fairly well. In our judgment he had better have left it undone. No good can come of it and harm may result, though it is doubtful if the book can have much influence.

International Clinics. A Quarterly of illustrated Clinical Lectures and especially prepared Original Articles on Treatment, Medicine, Surgery, Neurology, Pediatrics, Obstetrics, Gynecology, Orthopedics, Pathology, Dermatology, Ophthalmology, Otology, Rhinology, Laryngology and Hygiene. Edited by A. O. J. KELLY, M. D. Volume IV. Thirteenth Series, 1904. (*Philadelphia: J. B. Lippincott Company, 1904.*)

This volume, as did the preceding ones of the series, contains articles by well-known medical writers in all parts of the world. Their chief value seems to the reviewer to lie in the fact that they present the personal views and experiences of the writers. It is not claimed that they are exhaustive treatises on the subjects considered, but are short papers, usually written in an informal, almost conversational style. Most of them, as is intended, leave the same impression on the reader as though he had attended the author's clinic. Considered in this way, they furnish most attractive reading.

In the present volume appear short papers by Sir Dyce Duckworth, J. Chalmers Da Costa, W. W. Keen, Nicholas Senn, J. N. Musser, James Tyson and many others.

The clinical features and treatment of ulcer of the stomach are considered by Prof. Tyson. It is interesting to read this author's views in regard to the question much discussed at present concerning operative procedures in unperforated gastric ulcer. The writer's one experience with operation, of which he says "the result could not have been worse if the operation had been left undone," makes him hesitate to advise operation. "The offsets to the operation," he says, "are, first, the very slight mortality from ulcer, even when there have been many hæmorrhages, and second, the seriousness of the operation." Certainly the opinion of one who has had such a large medical experience should have weight with some who advise exploration of the stomach on almost any pretext.

Prof. Musser discusses "The treatment of pneumococcus infection of the lung, or croupous pneumonia." Nothing very strikingly new appears here though it is of very great interest to learn this clinician's exact method of handling this serious disease. Of importance is the slight use of alcohol in this disease by Prof. Musser, and also the stress he lays upon the value of venesection in certain cases, though he does not urge this so strongly as do some German teachers.

Prof. Julien, of the University of Paris, writes regarding the "Subcutaneous injections of mercury for syphilis," of which method of administration he has long been an advocate, but which has not been largely employed in this country. He discusses quite fully the relative values of the different preparations of mercury for this purpose and the exact methods for their administration.

A very interesting little paper, of only five pages, by Sir Dyce Duckworth on "The importance for students of physiognomical diagnosis in disease" should be taken to heart, not only by students, but also by teachers of medicine. He begins by quoting a favorite maxim of the late Professor Humphry of Cambridge, "Eyes first, eyes second, and hands third."

Probably the most interesting surgical paper is one by Professors Keen and Da Costa on "A case of inter-ilio-abdominal amputation for sarcoma of the ilium, and a synopsis of previously reported cases." The writer's case is most carefully described

and a full account of the operation as performed, showing the important modifications from the previous operations, is given. The fact that the result in this case was unsatisfactory, death occurring in 33 hours, does not detract from the value of this report to all who may be interested in these extensive operations.

Dr. McFarland discusses the present state of our knowledge of immunity and, while he has given a very interesting résumé, its brevity and conciseness prevent its being of much value except to those who are already conversant with the subject.

We are not able to mention even all the excellent papers which this volume contains. It is not to be expected, however, in a book of this kind that all of the articles should be of equal merit. One must confess that some of them read suspiciously like "space-fillers." The many good papers, however, more than compensate for hastily written and somewhat stereotyped productions.

The Infectivity of Enteric Fever. With observations on its origin and incidence at Caius College, Cambridge, Festiniog and Wicken-Bonaut. By ALEXANDER COLLIE, M. D. (Aberd.). (*Bristol: John Wright & Co. London: Simpkin, Marshall, Hamilton, Kent & Co., Lt'd., 1904.*)

This is a small pamphlet of forty-seven pages, in the preface of which it is stated that, "The writer's aim is to demonstrate that enteric fever is an infectious disease, communicable by direct personal intercourse, just as typhus fever is, and that explanations of its origin from drinking water have in several instances, failed in the ablest hands."

It is evident that the writer uses the term infectious much in the sense that contagious is generally understood. Certainly he would now need to search far to find one who does not already believe that enteric fever is *infectious*.

In evidence of its direct communicability the writer reviews the course of three epidemics occurring at Festiniog, Wicken-Bonaut, and Caius College, Cambridge. These epidemics occurred in 1863, 1869 and 1873 respectively. Certainly this epidemic based on epidemics occurring over thirty years ago, which apparently were not very thoroughly studied at the time, and the opinion concerning which now given by the writer being in direct variance with that given by the medical officer commissioned to examine it at the time, cannot be considered a strong support to the view that typhoid fever is frequently transmitted directly from patient to patient.

The book is chiefly interesting as one concerning typhoid fever, published in 1904, in which the typhoid bacillus is not mentioned and in which the first argument is that sewer-gas plays no rôle in the etiology of this disease! The pamphlet would have been obsolete twenty years ago.

To those, however, who feel that this direct mode of transmission of typhoid fever is of more importance than is usually ascribed to it, that "food, fingers and flies" play a considerable share in its spread, one or two statements of the writer are interesting. The Homerton Fever Hospital was opened for small-pox on the 15th of February, 1871, and closed for that disease on the 15th of the following June. During that time 1194 cases of small-pox were admitted. The staff consisted of about 100 persons. Among all these persons not a single case of enteric fever occurred. In October, 1871, the hospital was opened for fever cases and from that time up to the year 1878, 21 cases of enteric fever occurred amongst the staff.

Also from February 1, 1871, to September 19, 1879, 6771 cases of small-pox and 171 of scarlet fever had been treated in the Homerton Small-pox Hospital; and during this time 487 persons had been employed in attendance upon the sick and otherwise; but during all that time no case of enteric fever had occurred among these 7000 persons. On September 29, 1879, that hospital was opened for enteric fever, and within six weeks there were two cases among the nurses who nursed it, followed by a third a little later and by a fourth at the end of three months.

The Surgical Treatment of Bright's Disease. By GEORGE M. EDEBOHLS, A. M., M. D., LL. D. (*New York: Frank F. Lisiecki, 1904.*)

This book consists of the various papers on this subject published by Dr. Edebohls, followed by the histories of the patients operated on up to the end of the year 1903. There is also an analysis of all his cases and the results.

The value of the surgical treatment of chronic nephritis is of great interest to the profession; regarding it we would all wish to come to a definite opinion. For this, it is important to have as large a series of cases reported as possible, but if these reports are to be of value it is necessary that they be thorough and accurate. In connection with this it is a matter for regret that Dr. Edebohls' records are not more complete. This is especially the case in regard to the vascular conditions. Thus for example in Case 22 it is stated that the patient had enormous hypertrophy of the heart and general arterio-sclerosis. Fourteen months afterwards it is stated that his heart was found normal. This change may have occurred but it seems very unlikely, and it is a great pity that exact measurements are not given. If enormous hypertrophy can disappear in this way it is an exceedingly interesting clinical fact. Another curious clinical observation is a statement of the observation of an intermittent aortic regurgitant murmur occurring every third, fourth or fifth beat or even less frequently. Dr. Edebohls would be doing a great service to clinical medicine if he would report a series of these cases, as the majority of clinicians are quite in ignorance of any such condition.

Dr. Edebohls reports seventy-two cases, of which seven died within two years after the operation, and twenty-two died some time later. Of the forty-three survivors the result was unknown in three, unimproved in twenty, and cured in seventeen. In dealing with the results of any procedure in the treatment of chronic nephritis one has always to keep in mind that under ordinary medical treatment patients who are apparently at the point of death may recover and enjoy good health perhaps for many years. Such cases are by no means rare and one has to bear this in mind in discussing the results of any form of special treatment. In discussing both the group of improved and cured cases it seems that Dr. Edebohls rather loses sight of this point. Thus many of the cured cases occurred in very anæmic women, and one cannot but feel that in many of these under other treatment the results might have been equally good. The same criticism applies to cases occurring after pregnancy. It is curious to notice that in his report of cases *after* operation Dr. Edebohls is inclined to minimise the importance of a trace of albumen. Would he do so *before* operation? There is one group of cases regarding which further study will be needed, those characterized by the arterio-sclerotic kidney. It is difficult to recognise this group in Dr. Edebohls' cases. It is to be hoped that in future work special attention will be directed towards them. It is interesting to see Dr. Edebohls' experience of the operation on patients with albuminuric retinitis. They all died within a year after operation. Only two experienced decided benefit. Among the cases reported as cured many are noted as having very movable kidneys. This may give conditions suggestive of nephritis but it is doubtful if the diagnosis is justified in all cases.

The impression gotten from this book is that undoubtedly there seems to have been improvement in certain cases following operation. That such is the case there is little question. As to the possibilities of permanent cure we do not feel convinced by Dr. Edebohls' cases. There is one important point which he has brought out, that one kidney only may be diseased and the other apparently normal. It may be that many of the cases of albuminuria, especially in young subjects, are due to this latter con-

dition. The after-history of such cases will be especially important. In the examination of portions of kidney tissue removed with the capsule too much importance should not be given to slight degenerative changes. In the majority of persons over thirty an occasional sclerotic tuft and some increase in the fibrous tissue can be found.

If Dr. Edebohls wishes to convince the profession of the curability of chronic nephritis by operation (and we would only too willingly be convinced), he must try to present his evidence in more convincing form. Where one finds careless clinical observation in regard to one set of organs one can but hesitate as to the interpretation of the conditions in another system.

Saunder's Question Compends. Essentials of Materia Medica and Prescription Writing. By HENRY MORRIS, M. D., College of Physicians, Philadelphia. Sixth Edition. Thoroughly revised. By W. A. BASTEDO, Ph. G., M. D., Tutor of Materia Medica and Pharmacology at the Columbia University (College of Physicians and Surgeons), New York City. (*Philadelphia, New York, London: W. B. Saunders & Company, 1904.*)

If a book derives its value from the title, then this one should have it increased three-fold, for it is called:—"Essentials of Materia Medica and Therapeutics," "Essentials of Materia Medica and Prescription Writing," and "Essentials of Materia Medica, Therapeutics and Prescription Writing." All these titles combined go to make up a compact volume that has for many years been of good service to the student. The great improvement in the present edition should be welcomed with delight.

It is very difficult to carry compression of Materia Medica and Therapeutics to any great extent without sacrificing completeness of subject and clearness of definition. Yet the revisor has accomplished this in admirable style as the answers to the questions, of which the book consists, are clearly and tersely expressed.

Under the subject of Weights and Measures, the Metric system is not treated as practically as it should be. The information given would hardly induce a physician to adopt the system for prescription writing. Prescription writing occupying such a conspicuous place, as a part of the title of the book, more space should have been devoted to the subject. Generally speaking, I am sorry to say proper prescription writing seems to be losing its importance.

The definitions, arrangement and classification of the book could not be better. The classification is such that referring to the contents, one can at a glance see all the drugs under the proper headings. For instance, under the heading "Medicine acting on the Alimentary Canal" will be "Emetics, Gastric Sedatives, Carminatives and Cathartics," the various drugs following each subject. This arrangement being carried out throughout the book makes it of great value to the student for review work.

Mental Defectives, their History, Treatment and Training. By MARTIN W. BARR, M. D., Chief Physician Pennsylvania Training School for Feeble-Minded Children, Elwyn. Illustrated by 53 full page plates. (*Philadelphia: P. Blakiston's Son & Co., 1904.*)

This is a useful book and contains much that every physician should know about idiocy. The history of the philanthropic movement which in every land fostered, during the past century, the establishment and growth of institutions for the education of the feeble-minded is entertainingly told in a chapter of somewhat more than fifty pages. The author's attempt at classification is from an educational stand-point and strangely enough fails to distinguish physical states. He also employs the term moral imbecile—as if there could be a moral deficiency over-shadowing the mental defect. In all so-called moral imbeciles the arrest of mental development must be the primary condition, and the defect of the moral sense cannot be considered a condition by itself. Moral imbecility so-called is simply one of the symptoms of a fundamental mental deficiency.

The chapter on etiology is full and comprehensive. The influence of heredity is also given due weight in a discussion of this important factor in arrested mental development.

The chapter entitled "Training and Treatment" is the most valuable in the book and should be carefully read by all who have to do with defective children. In fact every teacher of children would profit by a study of the methods employed to secure the mental development and training of backward or slow children.

Idiot savants also receive a due share of attention and many striking instances of one-sided mental development with remarkable special powers are mentioned.

The book is undoubtedly the best which has been published in America. There are certain faults of arrangement which mar its unity and give one the impression that it is a collection of monographs on special topics, rather than a systematic treatise.

The concluding sentence of the Foreword (Preface?) deserves to be reproduced in this connection. "In this last (the preparation of the book) my three boys have materially contributed in addition to the aid gladly and efficiently rendered in the preparation of the book; many of the photographs by Jake, the translations by Arthur and the entire typewriting of the manuscript by Judson, all being an exposition of the main argument—the possibilities to be attained through training."

Diseases of the Nose, Throat and Ear. By SETH SCOTT BISHOP, M. D., D. C. L., LL. D. Third edition, thoroughly revised and enlarged. Illustrated with ninety-four colored lithographs and two hundred and thirty-two additional illustrations. 564 pages. (*Philadelphia: F. A. Davis Co., 1904.*)

This book is a fairly acceptable text-book for students who have but little time to devote to these specialties. The parts devoted to therapeutics are especially complete. It is to be regretted that the author has so incompletely described the diseases of the accessory sinuses and their treatment. The recent typical rhinological operations for correction of deviations of the septum, devised by Krieg and Freer are not mentioned. The book is attractively bound and printed. It contains numerous illustrations of specimens, instruments and apparatus.

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